

*A Powerful, Versatile Corporate PC*

# **POWERMATE® CT**

**S E R V I C E   A N D   R E F E R E N C E  
M A N U A L**

# **NEC**

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# Preface

This manual contains technical information for servicing and repairing the NEC PowerMate® CT systems manufactured by NEC Computers Inc. Use this manual for NEC PowerMate CT computers assembled in Europe. Check the regulatory sticker at the rear of the system to find the assembly location for the computer.

The manual contains hardware and interface information for users who need an overview of system design. The manual includes system setup information, disassembly procedures, and an illustrated parts list. The manual is prepared for NECC-trained customer engineers and support center personnel.

The manual is organized as follows.

**Section 1 — System Overview**, provides an overview of system features and includes brief descriptions of system components.

**Section 2 — System Configuration**, includes information on system IRQs, jumpers, and BIOS. The section also contains information on power management features and system utilities, including the BIOS FLASH Utility and PowerMate Product Recovery Program.

**Section 3 — Disassembly and Reassembly**, provides system disassembly and reassembly procedures. Each procedure is supported by disassembly illustrations.

**Section 4 — System Board**, includes information on cable and board connector locations, jumper settings, and upgrade sockets. Also provided is information on board components.

**Section 5 — Illustrated Parts Breakdown**, includes an exploded view diagram (illustrated parts breakdown) and a parts list for field-replaceable parts.

**Section 6 — Preventive Maintenance**, provides recommended maintenance information for maintaining the system in top condition.

**Section 7 — Troubleshooting**, includes information for solving possible system problems and their solutions.

**Section 8 — NECC Information Services**, lists telephone numbers for obtaining service. The section also includes information on NECC technical support and website.

**Section 9 — Specifications**, provides specifications for the major components in the system, including the system board, power supply, diskette drive, hard drive, and CD-ROM drive.

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# Abbreviations

A	ampere	DMA	direct memory access
AC	alternating current	DMAC	DMA controller
ACK	acknowledge	DMI	Desktop Management Interface
AGP	accelerated graphics port	DOS	disk operating system
AMR	audio modem riser	dpi	dots per inch
ASIC	application-specific integrated circuit	DRAM	dynamic RAM
AT	advanced technology (IBM PC)	DVD	digital versatile disc
ATA	AT attachment	ECC	error checking and correction
ATAPI	AT attachment packet interface	ECP	extended capabilities port
ATM	asynchronous transfer mode	EDO	extended data output
BBS	Bulletin Board Service	EGA	Enhanced Graphics Adapter
BCD	binary-coded decimal	EIDE	Enhanced IDE
BCU	BIOS Customized Utility	EISA	enhanced ISA
BIOS	basic input/output system	email	electronic mail
bit	binary digit	EMI	electromagnetic interference
BUU	BIOS Upgrade Utility	EPP	enhanced parallel port
bpi	bits per inch	EPROM	erasable and programmable ROM
bps	bits per second	ESD	electrostatic discharge
C	capacitance	EVGA	Enhanced Video Graphics Array
C	centigrade	F	Fahrenheit
Cache	high-speed buffer storage	FAX	facsimile transmission
CAM	constantly addressable memory	FCC	Federal Communications Commission
CAS	column address strobe	FG	frame ground
CD-ROM	compact disk-ROM	FM	frequency modulation
CD-RW	compact disk rewritable	FP	fast page
CH	channel	FRU	field-replaceable unit
clk	clock	ftp	file transfer protocol
cm	centimeter	GB	gigabyte
CMOS	complementary metal oxide semiconductor	GND	ground
COM	communication	HEX	hexadecimal
CONT	contrast	HGA	Hercules Graphics Adapter
CPGA	ceramic pin grid array	Hz	hertz
CPU	central processing unit	IC	integrated circuit
DAC	digital-to-analog converter	ID	identification
DACK	DMA acknowledge	IDE	intelligent device electronics
dB	decibels	IDTR	interrupt descriptor table register
DC	direct current	in.	inch
DCC	direct cable connection	INTA	interrupt acknowledge
DCE	data communications equipment	I/O	input/output
DDC	Display Data Channel	IPB	illustrated parts breakdown
DIMM	Dual In-Line Memory Module	IPC	integrated peripheral controller
DIP	dual in-line package	ips	inches per second
		IR	infrared

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IrDA	Infrared Data Association	PIO	parallel input/output
IRR	Interrupt Request register	pixel	picture element
ISA	Industry Standard Architecture	PLCC	plastic leaded chip carrier
ISP	internet service provider	PLL	phase lock loop
IRQ	interrupt request	POST	Power-On Self-Test
K	kilo (1024)	p-p	peak-to-peak
k	kilo (1000)	PPI	programmable peripheral interface
KB	kilobyte	PROM	programmable ROM
Kbps	Kilobits per second	PS/2	personal system/2
kg	kilogram	QFP	quad flat pack
kHz	kilohertz	R	read
lb	pound	RAM	random-access memory
LAN	local area network	RAMDAC	RAM digital-to-analog converter
LED	light-emitting diode	RAS	row address strobe
LDCM	LANDesk Client Manager	RDRAM <sup>®</sup>	Rambus <sup>®</sup> dynamic RAM
LSB	least-significant bit	RGB	red green blue
LSI	large-scale integration	RGBI	red green blue intensity
M	mega (million)	RIMM	Rambus inline memory module
mA	milliamps	rms	root mean square
max	maximum	ROM	read-only memory
MB	megabyte	rpm	revolutions per minute
MFM	modified frequency modulation	RTC	real-time clock
MHz	megahertz	R/W	read/write
MIDI	musical instrument digital interface	S	slave
mm	millimeter	SCSI	Small Computer System Interface
MMX	multimedia extensions	SDRAM	synchronous dynamic RAM
modem	modulator/demodulator	S.E.C.	single edge contact cartridge
MOS	metal-oxide semiconductor	S.E.P.P.	single edge processor package
MPEG	Motion Picture Experts Group	SG	signal ground
ms	millisecond	SGRAM	synchronous graphics RAM
MSB	most-significant bit	SIMM	single inline memory module
NC	not connected	SMART	Self-Monitoring, Analysis and Reporting Technology
NIC	networked information center	S/N	signal to noise ratio
NIC	network interface card	SNMP	simple network management protocol
NMI	Non-maskable Interrupt	SPM	standard page mode
ns	nanosecond	SRAM	static random access memory
NSRC	National Service Response Center	SRS	Sound Retrieval System
OCR	optical character recognition	SSI	small scale integration
OS	operating system	SVGA	Super Video Graphics Array
PAL	programmable array logic	SW	switch
PC	personal computer	T&D	test and diagnostics
PCB	printed circuit board	TSC	Technical Support Center
PCI	Peripheral Component Interconnect	TTL	transistor/transistor logic
PDA	personal digital assistant	tpi	tracks per inch
PFP	plastic flat package		

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UART	universal asynchronous receiver/transmitter
UHF	ultra high frequency
UL	Underwriter's Laboratories
UMA	unified memory architecture
UPS	uninterruptible power supply
URL	uniform resource locator
USB	universal serial bus
V	volt
Vac	volts, alternating current
VCR	video cassette recorder
Vdc	volts, direct current
VDT	video display terminal
VESA	video electronics standards association
VFC	VESA-compliant feature connector
VGA	Video Graphics Array
VHF	very high frequency
VLSI	very large scale integration
VRAM	video RAM
W	watt
WAN	wide area network
WRAM	Windows RAM
W	write
www	world wide web

# 1

## System Overview

- Configurations
  - Features
  - Components
-

---

This section provides an overview of the NEC PowerMate® CT system. Included are descriptions of the system's

- hardware configuration
- front, back, and inside features
- security features
- major components
- software.

The system can be configured as a minitower or as a desktop to suit the user's requirements.

## **Configuration**

The NEC PowerMate CT system is a built-to-order system for commercial offices. System features include an Intel® Pentium III processor, the Intel 820 chipset, two Rambus® inline memory module (RIMM™) sockets, Rambus dynamic random access memory (RDRAM), and a plug and play input/output (I/O) controller.

The system also features two universal serial bus (USB) ports, two serial ports, a parallel port, a MIDI/game port, and audio ports. Ultra direct memory access (DMA), remote wakeup ("Wake-On LAN"), accelerated graphics port (AGP), audio modem riser (AMR), and power management are supported.

Build choices include enhanced intelligent device electronics (EIDE) hard drives ranging from 10 gigabytes (GB) to 30 GB and higher. All drives feature Ultra DMA/66 and Self-Monitoring, Analysis and Reporting Technology (SMART).

System memory is provided in 64-MB (minimum), 128-MB, or 256-MB RIMM modules. Memory configurations range from 64 MB to 512 MB.

Additional build choices include a speaker set, LAN board, sound board, modem board, and peripheral devices such as a 40X or higher CD-ROM drive, an 12X or higher DVD-ROM drive, an 8x4x32x CD-ReWritable (RW) drive, an 8-MB or higher AGP video board, and a 250-MB capacity Zip® drive.

The following table summarizes the PowerMate CT system configuration.

---

## **PowerMate CT System Configuration**

<b>Component</b>	<b>Description</b>
System Board	Gigabyte GA-6CX7
Pentium III Processor*	667-MHz or higher, 133-MHz or higher FSB
Pentium III L1 Cache	32 KB SRAM integrated on processor
Pentium III L2 Cache	256 KB Pipeline Burst SRAM
Processor Mount	Socket 370
System RAM*	64 MB (minimum) to 512 MB of up to PC800 RDRAM in 2 RIMM sockets
Chip Set	Intel 820 with 82820 Memory Controller Hub, 82801AA I/O Controller Hub, 82802AA Firmware Hub, Audio-Codec 97 Controller, and System Manageability Bus
Winbond Super I/O Controller	Winbond Super I/O Controller W83627HF-AW for parallel, serial, keyboard, mouse, hardware monitor, diskette drive
Hard Drive*	Ultra DMA/66, with SMART technology: 10-GB or higher, 5400 rpm or higher
Graphics Memory*	8-MB or higher, depending on AGP video board
Audio	Yamaha Sound YMF 752-S
Diskette Drive	3.5-inch 1.44-MB
Power Supply	235-watt
Keyboard	Win 95-enhanced, PS/2 <sup>®</sup> -compatible
Mouse	3-button mouse, PS/2-compatible
CD-ROM Drive*	40X or higher CD-ROM drive
DVD-ROM Drive*	12X or higher DVD-ROM drive
CD-RW Drive*	8x4x32x (8x record, 4x rewrite, 32x read)
Zip Drive*	250-MB Capacity Iomega Zip Drive
PCI Connectors	System board support for up to five PCI expansion boards
LAN Board*	3Com PCI Ethernet 10/100 3C905C TX-M, Intel PCI Ethernet Pro 100+ 10/100 with Wake-On LAN, Accton PCI Ethernet 10/100 TX4 or TX5
Video Board*	8-MB AGP 4x nVidia™ Vanta™ video board or 32-MB AGP 4x nVidia TnT2™ Pro video board
Speakers*	NEC 10-watt, with AC power adapter

\* Built-to-order component

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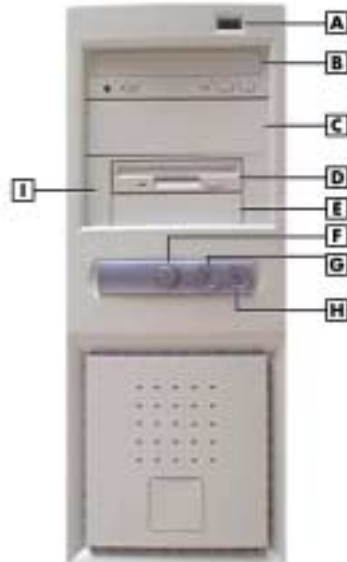
## Features

The system front, back, and inside features are described in the following paragraphs. Also included are descriptions of system security features.

### Front Features

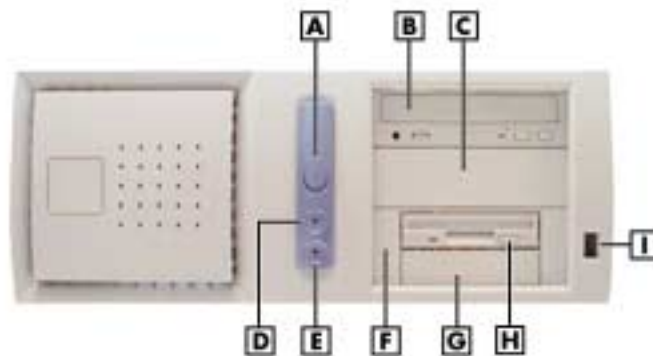
The PowerMate CT system can be used as a minitower or as a desktop. The following figures show the features on the front of the system for both setups. Brief descriptions of the features follow the figure.

*PowerMate CT Minitower Front Features*



- |                                      |   |
|--------------------------------------|---|
| A – USB Port                         | F – Power/Sleep Button                        |
| B – CD-ROM Drive                     | G – Power/Sleep Lamp                          |
| C – 5 1/4-Inch Bay                   | H – Disk Activity Lamp                        |
| D – Diskette Drive                   | I – Bracket for 3 1/2-Inch Accessible Devices |
| E – 3 1/2-Inch Accessible Device Bay |   |

*PowerMate CT Desktop Front Features*



- |                        |   |
|------------------------|---|
| A – Power/Sleep Button | F – Bracket for 3 1/2-Inch Accessible Devices |
| B – CD-ROM Drive       | G – 3 1/2-Inch Accessible Device Bay          |
| C – 5 1/4-Inch Bay     | H – Diskette Drive                            |
| D – Power/Sleep Lamp   | I – USB Port                                  |
| E – Disk Activity Lamp |   |



---

The system has the following devices, controls, and lamps at the front of the system (see the above figures for device, control, and lamp locations).

- Power/sleep button — press this button to turn on system power. To turn off power, close all applications, shut down Windows®; Windows 98 and Windows 2000 automatically power down the system. For Windows NT®, close all applications, shut down Windows NT, and press in the power button until the system powers down (approximately four seconds).

Press and immediately release the power button to suspend system operation and go into the power saving mode. If a VESA-compliant monitor is in use, the monitor also goes into a power-saving mode.

Press any key or move the mouse to exit the power saving mode and resume system operation.

- Power/sleep lamp — indicates if system power is on or off. Also indicates if the system is operating in a power saving mode.

A steady green lamp indicates that power is on. An amber lamp and a blank screen indicates that the system is in a sleep mode with full power reduction.

- Hard drive lamp — when blinking, indicates that the hard drive is active. A blinking lamp indicates that the hard drive is reading or writing data.
- CD-ROM drive — load and start programs from a compact disc (CD) and to play audio CDs. Controls and indicators include a CD tray open button, drive activity lamp, and emergency tray open feature. Controls for an optional DVD-ROM drive are similar.
- DVD-ROM drive — DVD-ROM drives offer many improvements over the standard CD-ROM technology, including superior video and audio playback, faster data access, and greater storage capacities.

The DVD-ROM drive uses DVD technology to read DVD discs as well as standard audio and video CDs.

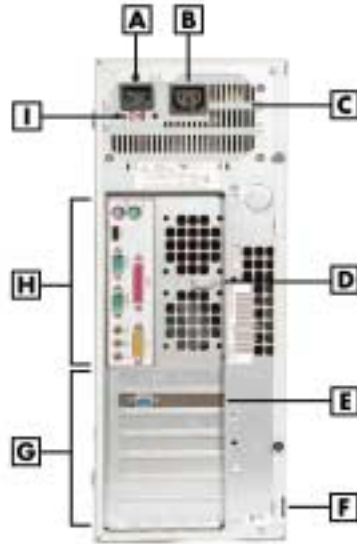
- CD-RW drive — use the drive to read and write data on a CD-RW disc many times, just like you would with a diskette, Zip disk, or hard drive.
- Zip drive — use the Zip drive with 3 1/2-inch Zip disks to back up work, archive old files, and transport work. The Zip drive supports both 250-MB and 100-MB Zip disks.
- Diskette drive — copy data files to and from a diskette or use as a bootable drive for loading and starting programs from a diskette. Controls and indicators include a diskette eject button and drive activity lamp.
- USB port — use this port to connect up to 127 universal serial bus (USB) devices without opening the system. A second port is on the rear of the system.

## **Rear Features**

The rear of the system contains external connectors and ports, a system power socket, a monitor power socket, a voltage switch, expansion board slots, and security features.

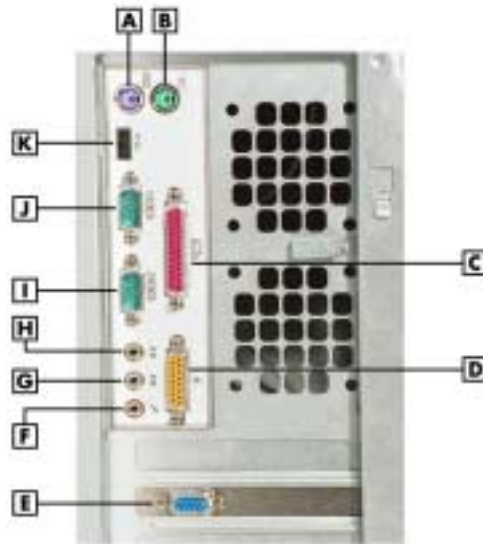
The following figures show minitower and desktop features. Brief descriptions of each item follow the figure. See the next two sections for information about the connectors and the power supply. See “Expansion Boards” in Section 3 for information about expansion board slots. See “Security Features” later in this section for information on security features.

*PowerMate CT Minitower Rear Features*



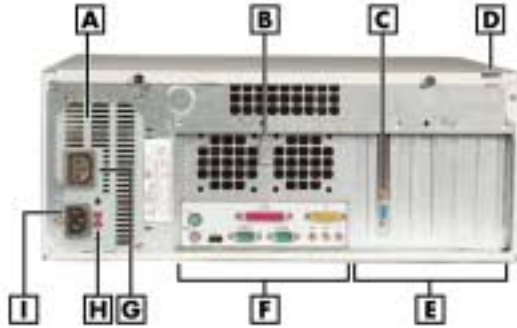
- |                                       |                             |
|---------------------------------------|-----------------------------|
| A – AC Power Connector                | F – Locking Tab             |
| B – Monitor Power Socket              | G – Expansion Slots         |
| C – Power Supply                      | H – System Board Connectors |
| D – Keyboard/Mouse Anti-Theft Bracket | I – Voltage Switch          |
| E – AGP Video Board                   |                             |

*Minitower Rear Connector Locations*



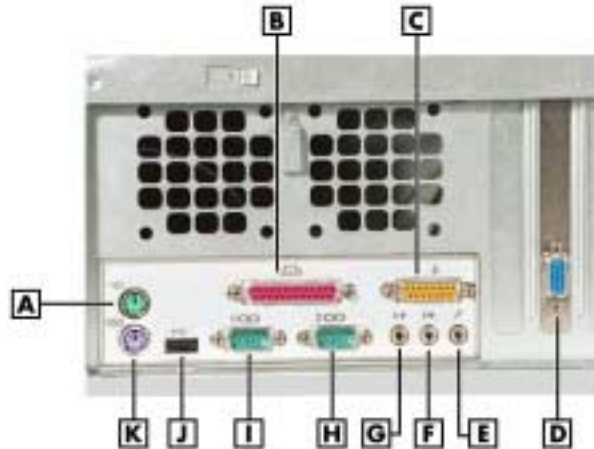
- |                        |                   |
|------------------------|-------------------|
| A – Keyboard Connector | G – Line In       |
| B – Mouse Connector    | H – Line Out      |
| C – Parallel Port      | I – Serial Port 2 |
| D – MIDI/Game Port     | J – Serial Port 1 |
| E – VGA Connector      | K – USB Port      |
| F – Microphone In      |                   |

## PowerMate CT Desktop Rear Features



- |                                       |                             |
|---------------------------------------|-----------------------------|
| A – Power Supply                      | F – System Board Connectors |
| B – Keyboard/Mouse Anti-theft Bracket | G – Monitor Power Socket    |
| C – AGP Video Board                   | H – Voltage Switch          |
| D – Locking Tab                       | I – AC Power Connector      |
| E – Expansion Slots                   |                             |

## Desktop Rear Connector Locations



- |                     |                   |
|---------------------|-------------------|
| A – Mouse Connector | G – Line Out      |
| B – Parallel Port   | H – Serial Port 2 |
| C – MIDI/Game Port  | I – Serial Port 1 |
| D – VGA Connector   | J – USB Port      |
| E – Microphone In   | K – Keyboard Port |
| F – Line In         |                   |

The rear of the system has the following external ports, connectors, jacks, and expansion slots.

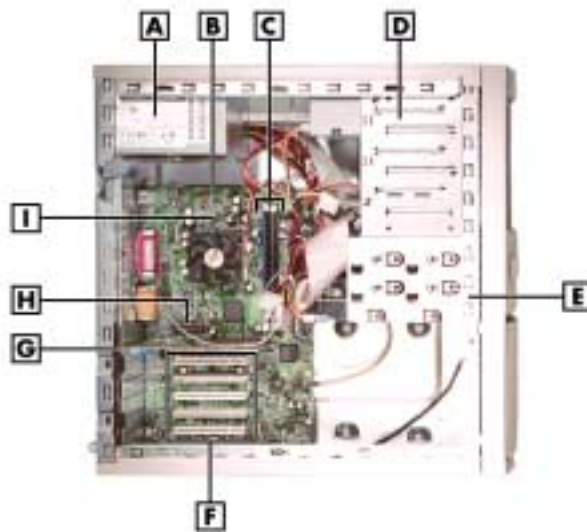
- Keyboard port — attach a PS/2<sup>®</sup>-compatible (personal system/2-compatible) keyboard (101-key or 102-key) with a 6-pin mini DIN connector to this port.
- Mouse port — attach a PS/2-compatible mouse to this port.
- Printer port — attach a parallel printer with a 25-pin connector to this port.
- USB port — use the USB port to connect up to 127 USB configured peripheral devices such as a printer, monitor, modem, mouse, and scanner. A second USB port is on the front of the system.
- Serial ports — serial port 1 (COM1) and serial port 2 (COM2) allow connection of serial devices with 9-pin connectors. The devices include a pointing device, serial printer, or modem.

- VGA monitor connector — attach a video graphics array (VGA)-compatible monitor (NEC MultiSync® monitor or other VGA-compatible monitor) with a 15-pin connector to the AGP connector on the installed video board.
- Monitor power socket — if a plug adapter is available, connect the power cord from the monitor to the monitor power socket to use fewer wall or surge protector outlets.
- Microphone in jack — use this jack to connect a microphone for recording audio information in data system files.
- Line in jack — use this jack to connect a stereo audio device such as a stereo amplifier or a cassette or minidisc player for playback or recording.
- Line out jack — use this jack to connect an amplified output device, such as powered speakers or headset, a stereo tape recorder, or an external amplifier for audio output.
- MIDI/joystick — use this connector to attach a joystick to the system for use with games.
- Expansion board slots — use these slots to install up to five optional PCI boards (graphics, LAN, modem, sound).

## Inside Features

The following figure shows the interior of the system and its major areas. A list of features follow the figure.

*Inside the System*



- |                                   |   |
|-----------------------------------|---|
| <b>A</b> – Power Supply           | <b>F</b> – PCI Expansion Board Connectors |
| <b>B</b> – System Board           | <b>G</b> – AGP Video Board                |
| <b>C</b> – RIMM Memory Sockets    | <b>H</b> – AMR Connector                  |
| <b>D</b> – Accessible Device Cage | <b>I</b> – Processor                      |
| <b>E</b> – Internal Drive Bracket |   |

---

The inside of the system has the following features:

- system board — contains the Pentium processor Socket 370 connector, two RIMM memory sockets, two IDE connectors, five PCI board connectors, an AGP board connector, an AMR board connector, diskette drive connector, system configuration jumpers, internal signal and power connectors, and external device connectors
- 5 1/4-inch accessible device cage — has two accessible 5 1/4-inch slots for the CD-ROM drive or DVD-ROM drive and another 5 1/4-inch device
- 3 1/2-inch accessible device cage — contains two accessible 3 1/2-inch slots, one of which houses the 1.44-MB diskette drive
- internal drive bracket — has three 3 1/2-inch internal device slots, one of which houses the standard hard drive
- expansion slots — provide five PCI board expansion slots, one of which houses the standard AGP video board
- 235-watt power supply — is switch selectable, 115 Vac or 230 Vac.

For more information on the above features, see “Components” in this section.

### ***Power Management Features***

The system comes with Advanced Power Management (APM) and Advanced Configuration and Power Interface (ACPI). Included as a subset to ACPI is Instantly Available Technology.

APM features Soft Power Off, which automatically powers down the system when exiting Windows 98 or Windows 2000 (not available for Windows NT). This feature is enabled or disabled through the system’s BIOS (see Section 2, “System Configuration,” for Power Management BIOS settings).

Instantly Available Technology features the ACPI sleep mode which maximizes power savings. When in the sleep mode, the system appears to be off. The power supply and fans are off and the power lamp is amber. Pressing a key or moving the mouse instantly wakes up the system and returns it to where it was before going into the sleep mode. This feature is enabled or disabled by setting jumpers on the system board (see Section 2, “System Configuration” for information on setting system board jumpers).

If the system has an optional internal or external modem installed, the Wake On Ring (WOR) and Resume On Ring (ROR) features of the system can be used. With WOR, the system can be powered up through the modem from either the Soft Power Off or ACPI modes. The first call through the modem powers on the system and the second call allows access to your system.

The ROR feature allows a single call on the modem to resume system operation and to allow system access. The ROR feature can be used while the system is in the sleep mode or the ACPI power on state.

See Section 2, “System Configuration” for information on setting the WOR and ROR features through the system’s BIOS. In addition, for the WOR feature, a cable must be connected to a modem and to the WOR connector on the system board.

---

## Software Features

NECC provides a variety of applications and hardware utilities with the system to let you take advantage of the system hardware capabilities.

### *Preloaded Software*

The system comes preloaded with the Microsoft® Windows® 98 operating system or the Windows 2000/Windows NT® operating system configuration.

If you have a Windows 2000/Windows NT configuration, you must choose the operating system you want to load. The operating system you choose is your only operating system and is the one that the Product Recovery Program restores.

NECC-provided applications, drivers, and utilities come loaded on the hard drive. You can install some of the applications from icons on the Windows desktop. Software available on the system includes the following applications:

- Microsoft Internet Explorer  
Internet Explorer provides a top-notch browser with preloaded links for easy access to the world wide web. Also use Internet Explorer to access one of the many new browser-based utilities.
- Norton AntiVirus™ 2000 Software  
Protect the system from viruses by running Norton's virus scan software.
- Adobe® Acrobat® Reader  
Use the Adobe Acrobat Reader to read and print portable document format (PDF) files found on the Internet and PDF documents included with various software applications.
- Online Documentation  
Get quick access to comprehensive information about your system in the online PowerMate CT User's Guide. See "Online Documentation" in Section 2 for a description of the documentation and how to use it.
- Intel LANDesk® Client Manager  
Use LANDesk software to track system information such as serial number, BIOS version, memory capacity, disk capacity, expansion board settings, and applications. Use LANDesk software for remote starts from a server computer using Wake-On LAN and remote boot.

### *NEC Product Recovery Program CD*

The system comes with an NEC Product Recovery Program CD and bootable diskette. Should a problem occur that causes data loss or corruption, you can use the NEC Product Recovery Program CD to restore the system to its original factory state or you can restore just the operating system and drivers. A full system restore loads the operating system and all the factory-supplied software that comes on the hard drive. See "Product Recovery Program" in Section 2 for information about using the restore options.

### *NEC PowerMate Driver CD*

Use the NEC PowerMate Driver CD to install drivers for NEC system options that are not part of the factory configuration. Also use the NEC PowerMate Driver CD to reinstall NECC-supplied software. See "PowerMate Driver CD" in Section 2 for information about installing drivers from the CD.

---

## ***Security Features***

The system has hardware, software, and mechanical security features that offer protection against unauthorized access to the system and data. The following security features are available.

### ***Password Security***

The BIOS Setup Utility includes a feature that allows a user to set either a user or supervisor password, or both.

The user password controls booting of the system and controls access to the Setup Utility and the keyboard. User access to the BIOS Setup Utility is limited when a supervisor password is set. The supervisor password allows full access to the system and the BIOS.

See Section 2, “System Configuration,” for further information on setting and using passwords.

### ***Windows Network Security Features***

The Windows Network Security feature is available through the Windows operating system. Check the Windows documentation for details.

### ***Keyboard/mouse Anti-theft Bracket***

The keyboard/mouse anti-theft bracket secures the keyboard and mouse cables to the system, making it difficult to remove the keyboard and mouse from the system.

### ***Locking Tab***

The system has a locking tab on the rear of the system. The tab fits through a mating slot in the rear edge of the chassis cover. Securing a padlock (not supplied) in the locking tab prevents removal of the system cover and access to the interior of the system.

### ***Chassis Intrusion Notification***

Whenever the system cover is removed, a hidden switch (if installed) sends a signal to the LANDesk Client Manager (LDCM). LDCM logs the incident and then reports it on screen the next time the system is rebooted.

### ***Hard Drive Password Protection***

The system supports password protection for the hard drive. Hard drive password protection restricts access to the drive if the drive is removed and installed in another system. The system does not prompt for hard drive passwords while the drive remains in the current system.

The passwords are written to the system BIOS and to the hard drive to ensure that the password protection travels with the drive if it is moved to another system. See Section 2, “System Configuration,” for additional information on using hard drive security.

---

## Components

The major system components are listed in the following table, along with the page number where each component is briefly described.

### *System Components*

<b>Component</b>	<b>Go to Page</b>
System Board	1-12
System Memory	1-13
Diskette Drive	1-13
Hard Drive*	1-13
AGP Video Board*	1-13
Power Supply	1-13
Keyboard	1-13
Mouse	1-14
CD-ROM Drive*	1-14
DVD-ROM Drive*	1-14
CD-RW Drive*	1-14
Zip Drive*	1-14
Speakers*	1-14
Modem Board*	1-15
Network Board*	1-15

\* Built-to-order component

### *System Board*

The system processor, memory, system battery, internal connectors, and most external connectors are housed on the system board. For information on the external connectors, see “External Connectors” earlier in this chapter.

The system board supports one diskette drive and up to four IDE devices such as hard drives, a CD-ROM drive, a DVD-ROM drive, a CD-RW drive, or a Zip drive.

Internal connectors on the system board include:

- primary and secondary IDE connectors with Ultra DMA/66 support
- one diskette drive connector
- one processor socket
- front panel connectors for system lamps and USB
- power connectors
- two RIMM sockets
- five PCI connectors
- one AGP connector
- one AMR connector.

For further information on the system board, see Section 4, “System Boards.”



---

## **System Memory**

The system supports up to 512 MB of high-speed non-ECC or ECC RDRAM memory in two RIMM sockets on the system board. Supported are 184-pin, PC800-MHz modules in 64-, 128-, and 256-MB unbuffered configurations.

The RIMM modules can be installed in one or two sockets and can vary in size between sockets. If only one RIMM module is installed, a continuity module must be installed in the empty socket.

## **Diskette Drive**

A single diskette drive is supported in the system. The installed 1.44-MB 3 1/2-inch diskette drive is connected by a ribbon cable with two connectors. The diskette drive cable plugs directly into the system board. There are no switches or jumpers that need to be set and the diskette drive is terminated.

Diskette drive specifications are given in Section 9, "Specifications."

## **Hard Drive**

All systems ship with one internal 3 1/2-inch EIDE hard installed inside the system, under the CD-ROM drive. Drives are available in 10-GB or higher Ultra DMA/66 models.

An Ultra DMA/66 cable connects the hard drive to the primary IDE channel on the system board. The drive is connected as the master device on the primary channel.

Hard drive jumper settings are given in Section 2, "System Configuration." The location of the primary IDE connector on the system board is shown in Section 4, "System Boards." Hard drive specifications are given in Section 9, "Specifications."

## **AGP Video Board**

Systems ship with an AGP video board. The board has a 4x nVidia Vanta™ 3D graphics processor, 8 MB of video memory, and a VGA connector. The processor supports the AGP 4X bus, 3D graphics, and 2D graphics. It also supports video, software, and DVD playback. The system can be upgraded with an optional 32-MB 4x nVidia TnT2 Pro AGP video board.

Connect a VGA compatible monitor to the VGA connector on the AGP video board.

## **Power Supply**

The 235-watt power supply is mounted inside the system unit. It supplies power to the system board, option boards, diskette drive, hard drives, CD-ROM or other drives, keyboard, mouse, and other internal options. A fan inside the power supply provides system cooling.

Power supply connector locations on the system board are given in Section 4, "System Board." Power supply specifications are given in Section 9, "Specifications."

## **Keyboard**

The PS/2-compatible ergonomic keyboard is standard equipment for the system. The keyboard provides a numeric keypad, separate cursor control keys, 12 function keys, and is capable of up to 48 functions. Key status lamps on the keyboard include Num (Numeric) Lock, Caps (Capital) Lock, and Scroll Lock.

The keyboard's six-pin connector plugs into the back of the system. Keyboard specifications are given in Section 9, "Specifications."

---

## **Mouse**

The system ships with a PS/2-compatible mouse as standard equipment. The mouse has a self-cleaning mechanism that prevents a buildup of dust or lint around the mouse ball and tracking mechanism.

The six-pin mouse cable connector plugs into the back of the system. Mouse specifications are given in Section 9, “Specifications.”

## **CD-ROM Drive**

Some systems come with a 40X or higher CD-ROM drive. The drive features up to 40-speed or higher technology, affording faster data transfer and smoother animation and video. The CD-ROM drive comes with an Enhanced IDE (EIDE) interface. The drive is fully compatible with Kodak Multisession Photo CDs™, CD-I, FMV, and CD Plus, as well as standard CDs. The CD-ROM drive can also play audio CDs (for systems with sound capabilities).

An IDE cable connects the CD-ROM drive to the secondary IDE channel on the system board. The drive is connected as the master device on the secondary channel.

CD-ROM jumper settings are included in Section 2, “System Configuration.” Specifications for the CD-ROM drive are given in Section 9, “System Specifications.”

## **DVD-ROM Drive**

Some systems come with an 12X or higher DVD-ROM drive. The drive offers many improvements over the standard CD-ROM, including superior video and audio playback, faster data access, and greater storage capabilities.

An IDE cable connects the DVD-ROM drive to the secondary IDE channel on the system board. The drive is connected as the master device on the secondary channel.

DVD-ROM jumper settings are included in Section 2, “System Configuration.” Specifications for the DVD-ROM drive are given in Section 9, “System Specifications.”

## **CD-RW Drive**

Some systems come with an 8x4x32x (8x record, 4x rewrite, 32x read) compact disk-ReWritable (CD-RW) drive. Use the drive to record data on a CD-RW disc, just like you would on a diskette, Zip® disk, or hard drive.

## **Zip Drive**

Some systems come with a 250-MB capacity internal ATAPI Zip® drive. Connect the Zip drive to one of the IDE connectors. Use the Zip drive with 3 1/2-inch Zip disks to back up work, archive old files, and transport work. The Zip drive supports both 250-MB and 100-MB Zip disks.

## **Speakers**

Some systems come with a high-quality 10-watt stereo speaker set, an AC adapter, and connecting cables. If the speaker set has a volume control, adjust the speaker volume by using this control. Volume can also be controlled by the Windows sound software. The speaker set connects to the speaker line out jack on the back of the system. Speaker specifications are given in Section 9, “Specifications.”

---

## ***Modem Board***

Some systems come with a V.90 rated 56-kilobits per second (Kbps) PCI modem board. The modem board allows the connection of a phone line to the system for data communications functions.

## ***Network Board***

Some systems might come with a 10/100 network board installed in a PCI slot. Specifications for the network board are given in Section 9, “Specifications.”

# 2

## System Configuration

- Interrupt Requests
  - Jumper Settings
  - BIOS Setup Utility
  - Hard Drive Security
  - FLASH Utility
  - Online Documentation
  - Product Recovery Program
  - PowerMate Driver CD
  - Intel Processor Serial Number Control Utility
-

---

This section provides information for configuring the system. The section includes:

- system interrupt request (IRQ) assignments
- system jumper settings
- procedures for using the Phoenix® Technologies Ltd. BIOS Setup Utility to configure the system
- description and procedures for using hard drive security for password protection of the hard drive
- descriptions and procedures for using the following utilities and applications
  - FLASH Utility
  - Online Documentation
  - Product Recovery Program
  - PowerMate Driver CD
  - Intel Processor Serial Number Control Utility.

## ***Interrupt Requests***

The following paragraphs list the system interrupts (IRQs), parallel interrupts, and serial interrupts. See Section 4, “System Board,” for parallel and serial addresses. For Windows 98 and Windows 2000, a listing of hardware resources is available on the system. Click **Start**, point to **Programs, Accessories**, and **System Tools**, and click **System Information**.

### ***System Interrupts***

The system has 16 IRQs (IRQ 0 through 15) assigned to different devices (for example, printer, modem, keyboard, mouse). Initial IRQ settings are assigned at the factory, with settings dependent on the installed device(s). See “BIOS Setup Utility” in this section for information on using the utility to assign or change the interrupts.

The following table lists the IRQ settings. Assignments 0 through 15 are in order of decreasing priority.

#### ***Interrupt Level Assignments***

<b>Interrupt Priority</b>	<b>Interrupt Device*</b>
IRQ00	System Timer
IRQ01	Standard 101/102 or MS Natural Keyboard
IRQ02	Programmable Interrupt Controller
IRQ03	Communications Port (COM2)
IRQ04	Communications Port (COM1)
IRQ05	MPU-401 Compatible
IRQ06	Standard Floppy Disk Controller
IRQ07	ECP Printer (LPT 1)

\* IRQ settings may vary, depending on system configuration.

---

### ***Interrupt Level Assignments***

<b>Interrupt Priority</b>	<b>Interrupt Device*</b>
IRQ08	System CMOS/real time clock
IRQ09	Shared Resource: ACPI IRQ Holder for PCI IRQ Steering/YAMAHA AC-XG Audio Device/Intel 82801AA SMBus Controller/SCI IRQ used by ACPI bus
IRQ10	Shared Resource: ACPI IRQ Holder for PCI IRQ Steering/Winfast 3D S32011 (TNT2-PRO)
IRQ11	Shared Resource: ACPI IRQ Holder for PCI IRQ Steering/Intel 82801AA USB Universal Host Controller
IRQ12	WheelMouse (PS/2)
IRQ13	Numeric Data Processor
IRQ14	Primary IDE Controller/Intel 82801AA Bus Master IDE Controller
IRQ15	Secondary IDE Controller

\* IRQ settings may vary, depending on system configuration.

### ***Parallel Port Interrupts***

The parallel port I/O interrupts are given in the following table.

#### ***Parallel Port Interrupts***

<b>Port</b>	<b>Interrupt</b>
LPT1	IRQ07
LPT2	IRQ07
LPT3	IRQ07

---

## Serial Port Interrupts

The interrupts for serial port 1 and serial port 2 are given in the following table. If serial ports share an interrupt, verify that hardware and software added to the system can share these interrupts without problems.

**Serial Port Interrupts**

Port	Interrupt
COM1	IRQ04
COM2	IRQ03
COM3	IRQ04
COM4	IRQ03
COM1	IRQ03
COM2	IRQ04
COM3	IRQ03
COM4	IRQ04

## Jumper Settings

Jumpers on the boards and devices in the system are used to set the system configuration. Boards and devices using jumpers include:

- system board
- hard drive
- CD-ROM drive.


The following paragraphs list the jumpers and their factory settings.

### System Board Jumper Settings

The system board has nine jumper blocks for configuring the system for particular system requirements. Use the following figure to locate the jumper blocks on the system board. See the table after the figure for jumper descriptions and factory settings.

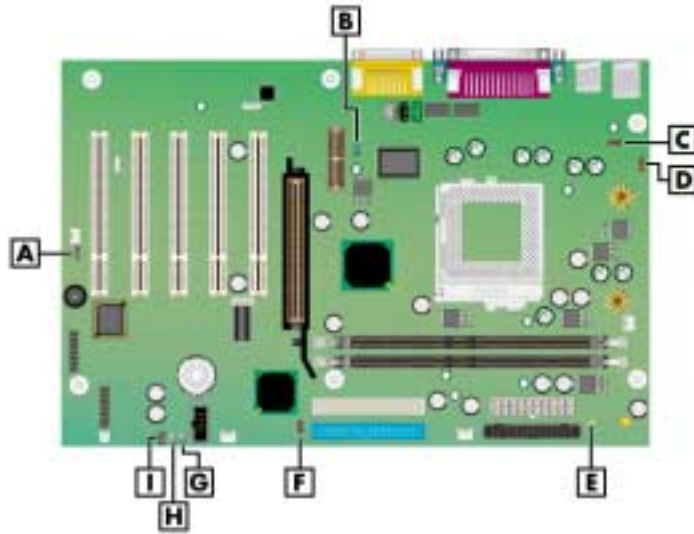
Procedures for setting the jumpers are included in Section 4, "System Board." Specifications for the system board are given in Section 9, "Specifications."

---

 **CAUTION** Jumpers are set correctly at the factory for the system configuration. Only change or check the appropriate jumper settings. Otherwise, keep the jumpers at their factory settings.

---

## System Board Jumper Block Locations



- A** – CMOS Clear (JP4)  
**B** – Audio Modem Riser Select (JP11)  
**C** – Rear USB Device Wakeup (JP3)  
**D** – PS/2 Keyboard Power On (JP16)  
**E** – Save to RAM (JP18)  
**F** – BIOS Recovery (JP5)  
**G** – USB Selection (JP28)  
**H** – USB Selection (JP27)  
**I** – Front USB Wake Up (JP21)

**CAUTION** To prevent damage to the system board, do not set jumpers while power is on.

### System Board Jumper Block Settings

Function	Jumper	Setting	Description
CMOS Clear	JP4	2-3	Factory setting. Maintains system board configuration in CMOS RAM with onboard battery.
		1-2	Clears CMOS while system power is off. Return jumper to pins 2 and 3 before powering system on.  <b>CAUTION:</b> To prevent damage to system board, avoid clearing CMOS while power is on.
Audio Modem Riser (AMR)	JP11	1-2	Factory setting. Enables onboard audio CODEC.
		2-3	Disables onboard audio CODEC. Use this setting if an AMR sound board is installed.



---

### **System Board Jumper Block Settings**

<b>Function</b>	<b>Jumper</b>	<b>Setting</b>	<b>Description</b>
Rear USB Device Wakeup	JP3	2-3	Factory setting. Enables system wakeup via input from the rear USB port.
		1-2	Disables system wakeup via input from the rear USB port.
PS/2 Keyboard at Power On	JP16	2-3	Factory setting. Disables the keyboard at power on.
		1-2	Enables the keyboard at power on.
Save to RAM	JP18	Jumpered	Factory setting. Enables Suspend to RAM (STR) function. In STR mode, the system saves to memory all configuration information and all running programs. When the system leaves Suspend mode, it restores everything from memory.
		Open	Disables Save to RAM function.
BIOS Recovery	JP5	1-2	Factory setting. Sets the system for normal operation. The BIOS uses current configuration information and passwords at power on.  To enable BIOS recovery for a corrupted system, remove the jumper. Wait 10 seconds. Replace the jumper on pins 1 and 2.
		2-3	Restores Safe BIOS settings as the default BIOS settings and loads the BIOS Setup at power on.
USB Port Selection	JP27, JP28	1-2	Factory setting. Enables the front USB port and rear USB port.
		2-3	Disables the front USB port and enables the rear USB port.
		2-3	Disables the front USB port and enables the rear USB port.
Front USB Device Wakeup	JP21	2-3	Factory setting. Disables system wakeup from the USB device connected to the front USB port.
		1-2	Enables system wakeup from the USB device connected to the front USB port.

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## **Maxtor EIDE Hard Drive Jumper Settings**

The factory settings for the jumpers on the Maxtor EIDE Ultra DMA/66 hard drive are shown in the following table. The settings are for a single hard drive installed in the system as the master device. Specifications for the hard drive are included in Section 9.

### **Maxtor EIDE Hard Drive Jumper Settings**

<b>Function</b>	<b>Jumper Pins</b>	<b>Description</b>
Master Device	J50-1, J50-2 J48-2, J46-2	Sets hard drive as master device in single drive system. Factory setting: J50 pins 1 and 2 jumpered; J48 pin 2 and J46 pin 2 jumpered.
Slave Device	J48-2, J46-2 J44-2, J42-2	Sets hard drive as slave. Not used.
Cable Select (CSEL)	J48-1, J48-2 J44-2, J42-2	Not used.
Cylinder Limitation		Not used.

## **Quantum EIDE Hard Drive Jumper Settings**

The factory settings for the jumpers on the Quantum EIDE Ultra DMA/66 hard drive are shown in the following table. The settings are for a single hard drive installed in the system as a master device. Specifications for the hard drive are included in Section 9.

### **Quantum EIDE Hard Drive Jumper Settings**

<b>Function</b>	<b>Jumper Pins</b>	<b>Description</b>
Master Device (DS)	Jumpered	Sets hard drive as master device in single drive system. Factory setting: DS pins jumpered.
Slave Device	Open	Sets hard drive as slave.
Cable Select (CS)		Not used.
Park (PK)		Use these pins to "park" a jumper not in use.

## **CD-ROM Drive Jumper Settings**

The type of switch or jumpers and the settings for the CD-ROM drive depend on the manufacturer's model. The NECC factory setting is for the CD-ROM drive installed as the master device on the secondary channel. Specifications for the CD-ROM drive are included in Section 9.

## BIOS Setup Utility

The Phoenix® Technologies Ltd. BIOS Setup Utility lets you configure the main components of the system. The utility is resident in the system FLASH memory and does not require a diskette or an operating system present to run.

Your system ships from the factory with the correct system parameters for your configuration. Unless you add optional hardware, you do not need to run the BIOS Setup Utility to operate the system. However, you might wish to run the BIOS Setup Utility to set features that customize the system, such as security features.

NECC recommends that you print out or write down the current BIOS Setup parameters and store the information in a safe place. This lets you restore the system to the current parameters if you need to replace the CMOS battery (see “CMOS Battery” in Section 3).

### How to Start Setup

To start the BIOS Setup Utility, follow these steps.

1. Turn on or reboot the system.
2. Press **F2** at the NEC startup screen (**F2** appears on the bottom of the screen). You have about five seconds to press **F2**.

Setup's Main Menu window appears similar to the following screen.

**Note** The following screen is a typical screen for a system with a 10.0-GB hard drive. The actual settings on the menu screen depend upon the hardware installed in the system.

#### Setup Main Menu

Phoenix BIOS Setup Utility					
Main	Advanced	Security	Power	Boot	Exit
System Time: [10:54:00]					Item Specific Help
System Date: [06/05/2000]					
Language: [English (US)]					
Legacy Diskette A: [1.44M 2.88 Mbit/s 1/2"]					
▶ Primary Master: [1020MB]					
▶ Primary Slave: [None]					
▶ Secondary Master: [CD-ROM]					
▶ Secondary Slave: [None]					
▶ SMART Diskette Monitoring: [Enabled]					
▶ Keyboard Features:					
▶ Post-Time Diagnostic Screens: [Disabled]					
System Memory: 640 MB					
Standard Memory: 150048 KB					
10GB Hard Drive: 10000010					
CPU Serial #: [Disabled]					
F10 Help	↑ Select Item	→ Change Value	F10 Save and Exit		
ESC Exit	↓ Select Item	Enter Select Sub-Menu	F9 Save and Exit		

---

## How to Use Setup

The Setup Utility has a Main Menu window and six top-level menus with submenus (see the above figure). The menu bar at the top of the Main Menu window lists the following top-level menus.

- **Main** — Use the Main Menu for basic system configuration. For example, select Main to set the system date, set diskette and hard disk parameters, or check memory parameters.
- **Advanced** — Use the Advanced Menu to set the system for Plug and Play, PCI configuration, serial port and printer port addresses and interrupts, memory cache configurations, I/O device configuration, DMI event logging, and more.
- **Security** — Use this menu to set User and Supervisor Passwords, security mode, password on boot, network boot, and virus check.
- **Power** — Use the Power Menu to set power management parameters such as power savings, auto suspend timeout, hard disk timeout, and system switch.
- **Boot** — Use this menu to set boot options, including restore on ac/power loss, set boot sequence, and assign drive letters to removable devices.
- **Exit** — Exits the Setup Utility with various save or discard options.

Use the keys listed in the legend bar on the bottom of the Setup Menu to make the selections or exit the current menu. The following table describes the legend keys.

### Setup Key Functions

Key	Function
F1	Provides help for the parameter field being displayed.
Esc	Exits the menu.
Up or down arrow keys	Moves cursor up and down for item selection.
Left or right arrow keys	Selects next menu.
-/+ keys	Changes values.
Enter	Executes a command or selects submenu.
F9	Loads the default configuration values for the current menu.
F10	Saves the current values and exits Setup.

To select one of the six menus from the menu bar, use the left and right arrow keys. Use the up or down arrow keys to select an item under the menu.

Menu items preceded by a > contain a submenu of selectable fields for setting system parameters. Display a submenu by using the up or down arrow keys to move the cursor to the desired submenu, then press **Enter**.

An Item Specific Help window on the right side of each menu displays the help text for the currently selected Setup option. It updates as the cursor moves to each new field.

Pressing **F1** on any menu brings up the General Help window that describes the legend keys and their functions.

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Press **Esc** to exit the current window.

The following subsections describe the six top level menus and their submenus.

## **Main Menu**

Choose the Main Menu by selecting Main in the legend bar on the Main Menu screen. Other Main Menu options are available by selecting submenus.

Use the arrow keys to select one of the Main Menu options and press **Enter** to select a submenu. Items with grayed-out text are not available. Explanations of each Main Menu item are in the following table.



**CAUTION** Setting items on this menu to incorrect values can cause the system to malfunction.

---

**Note** The following BIOS settings are typical and can vary between system configurations. You should record your system's BIOS settings and save them in a safe place in the event you need to restore or update the BIOS.

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### **Main Menu Items**

<b>Menu Item</b>	<b>Settings (default is bold)</b>
System Time	Set system time in this field. Press <b>Tab</b> or <b>Enter</b> to move between hour, minute, and second fields.  Example: 09:30:50
System Date	Set system date in this field. Press <b>Tab</b> or <b>Enter</b> to move between month, date, and year fields.  Example: 06/05/2000
Language	<b>English</b> (US), Japanese  Selects the display language for the BIOS.
Legacy Diskette A	Disabled 360 KB 5 1/4" 1.2 MB 5 1/4" 720 KB 3 1/2" <b>1.44/1.25 MB 3 1/2"</b> 2.88 MB 3 1/2"  Selects the diskette drive type.

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## **Main Menu Items**

<b>Menu Item</b>	<b>Settings (default is bold)</b>
Primary IDE Master	10263 MB
Primary IDE Slave	None
Secondary IDE Master	CD-ROM
Secondary IDE Slave	None
	<p>Note: The following setting information applies to the primary and secondary master and slave devices.</p> <p>Each device menu item displays the hard drive or CD-ROM identifier if a device is installed.</p> <p>If you install a hard drive that does not feature auto IDE type detection or your IDE hard drive was formatted on another system with parameters different from those reported by the drive, enter a parameter for each of the fields in the device submenu.</p> <p>Bring up a device submenu by pressing <b>Enter</b>. Each submenu and its fields are described next.</p>
Type	<p>User, <b>Auto</b>, None, CD-ROM, IDE/ATAPI Removable</p> <p>When set to Auto, the values for Cylinders, Heads, Sectors, Multi-Sector Transfer, LBA Mode Control, Transfer Mode, and Ultra DMA Mode are displayed but are read only.</p> <p>When set to Auto, the BIOS detects what the drive is capable of, not the translation mechanism that was used to format the drive. If a drive is run in a mode other than the mode in which it was partitioned and formatted, unpredictable results might occur, including data loss.</p> <p>When set to None, informs the system to ignore this drive.</p> <p>When set to CD-ROM or IDE/ATAPI Removable, allows the manual entry of all fields described next.</p> <p>When set to User, allows the manual entry of all fields described next.</p>
Cylinders	When Type is Auto, value in the Cylinders field is auto-detected and field is read only.
Heads	When Type is Auto, value in Heads field is auto-detected and field is read only.
Sectors	When Type is Auto, value in Sectors field is auto-detected and field is read only.
Maximum Capacity	8455 MB
Total Sectors	20044080 total sectors
Maximum Capacity	10263 MB

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### **Main Menu Items**

<b>Menu Item</b>	<b>Settings (default is bold)</b>
Multi-Sector Transfers	Disabled, 2, 4, 8, 16 sectors  Determines the number of sectors per block for multi-sector transfers.  When Type is Auto, value in Multi-Sector Transfers field is auto-detected and field is read only.
LBA Mode Control	<b>Enabled</b> , Disabled  When Enabled is selected, it causes logical block addressing to be used in place of cylinders, heads, and sectors.  When Type is set to Auto, the value in the LBA Mode field is auto-detected and the field is read only.
32-Bit I/O	<b>Disabled</b> , Enabled  When Enabled, allows 32 bit data transfers.
Transfer Mode	Standard, <b>Fast PIO1</b> , <b>Fast PIO2</b> , <b>Fast PIO3</b> , <b>Fast PIO4</b> , <b>Fast PIO3/DMA1</b> , <b>Fast PIO4/DMA2</b>  Selects the method for moving data to and from the drive.  When Type is set to Auto, the value in the field is auto-detected and the field is read only.
Ultra DMA Mode	Disabled, Mode 0, Mode 1, Mode 2, Mode 3, Mode 4  Selects the Ultra DMA Mode for moving data to and from the drive. Autotype the drive to select the optimum transfer mode.  When Type is set to Auto, the value in the field is auto-detected and the field is read only.
SMART Monitoring	<b>Enabled</b> , Disabled  IDE Failure Prediction  When Type is set to Auto, the value in the field is auto-detected and the field is read only.
Keyboard Features	Press <b>Enter</b> to check or change keyboard parameters.
Numlock	Auto, On, <b>Off</b>  Selects the power-on state for Numlock.
Key Click	<b>Disabled</b> , Enabled  Enables or disables key click.
Keyboard auto-repeat rate	<b>30/sec</b> , 26.7/sec, 21.8/sec, 18.5/sec, 13.3/sec, 10/sec, 6/sec, 2/sec  Selects key repeat rate.

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### **Main Menu Items**

<b>Menu Item</b>	<b>Settings (default is bold)</b>
Keyboard auto-repeat delay	1/4 sec, <b>1/2 sec</b> , 3/4 sec, 1 sec Selects delay before key repeat.
Legacy USB Support	Disabled, <b>Enabled</b> Disables or enables legacy USB support.
Boot-Time Diagnostics Screen	<b>Disabled</b> , Enabled Selecting Enabled displays the diagnostic screen during boot.
System Memory	Displays amount of conventional memory detected during boot. This field is read-only and cannot be changed from BIOS Setup. Example: 640 KB
Extended Memory	Displays amount of extended memory detected during boot. This field is read-only and cannot be changed from BIOS Setup. Example: 130048 KB
BIOS Revision	Displays the BIOS revision number. This field is read-only and cannot be changed from the BIOS Setup. Example: 167A0118
Processor Serial Number	Disabled, <b>Enabled</b> Controls detection of the processor serial number.


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### **Advanced Menu**

Choose the Advanced Menu by selecting Advanced in the legend bar on the Main Menu screen. Other Advanced Menu options are available by selecting submenus.

Use the arrow keys to select one of the Advanced Menu options and press **Enter** to select a submenu. Items with grayed-out text are not available. Explanations of each Advanced Menu item are in the following table.

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 **CAUTION** Setting items on this menu to incorrect values can cause your system to malfunction.

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## **Advanced Menu**

<b>Menu Item</b>	<b>Settings (default is bold)</b>
Plug and Play OS	No, Yes  Select Yes if you are booting a Plug and Play capable operating system.  Select No if you want the BIOS to configure non-boot devices.
Reset Configuration Data	<b>No</b> , Yes  Select Yes if you want to clear the Extended System Configuration Data (ESCD) area.
PCI Configuration	Press <b>Enter</b> to access the following submenus.
PCI IRQ Line 1	Disabled, <b>Auto Select</b> , 3, 4, 5, 7, 9, 10, 11, 12, 14, 15
PCI IRQ Line 2	
PCI IRQ Line 3	Use Auto Select if there are no ISA or EISA devices installed on the system.
PCI IRQ Line 4	Select an IRQ (3-15) if installing a PCI device requiring an IRQ and if the IRQ is not already in use by ISA or EISA devices.
CPU Level 1 Cache	<b>Enabled</b> , Disabled  Enables or disables the CPU Level 1 cache.
CPU Level 2 Cache	<b>Enabled</b> , Disabled  Enables or disables the CPU Level 2 cache.
CPU Level 2 Cache ECC Check	Enabled, <b>Disabled</b>  Enables or disables the CPU Level 2 cache ECC check.
Cache Memory	Press <b>Enter</b> to access the following submenus.
Memory Cache	Disabled, <b>Enabled</b>  Sets the state of the memory cache.
Cache System BIOS Area	Uncached, <b>Write Protect</b>  Controls caching of system BIOS area.
Cache Video BIOS Area	Uncached, <b>Write Protect</b>  Controls caching of system video BIOS area.
Cache Base 0-512K	Uncached, Write Through, Write Protect, <b>Write Back</b>  Controls caching of 512K base memory.
Cache Base 512-640K	Uncached, Write Through, Write Protect, <b>Write Back</b>  Controls caching of 512K-640K base memory.
Cache Extended Memory Area	Uncached, Write Through, Write Protect, <b>Write Back</b>  Controls caching of system memory above one MB.

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## **Advanced Menu**

<b>Menu Item</b>	<b>Settings (default is bold)</b>
Cache C800-CBFF	<b>Disabled</b> , Write Through, Write Protect, Write Back
Cache CC00-CFFF	
Cache D000-D3FF	Setting at Disabled prohibits caching.
Cache D400-D7FF	
Cache D800-DBFF	Setting at Write Through permits writes to be cached and sent to main memory at once.
Cache DC00-DFFF	
Cache E000-E3FF	Setting at Write Protect causes the BIOS to ignore writes.
	Setting at Write Back permits write caching but delays sending data to main memory until necessary.
I/O Device Configuration	Press <b>Enter</b> to access the following submenus.
Serial Port A	Disabled, Enabled, <b>Auto</b>
	Setting at Enabled allows the user to configure the port.
	Setting at Auto enables the BIOS or operating system to configure the port.
Base I/O Address	<b>3F8</b> , 2F8, 3E8, 2E8
	Selects the base I/O address for serial port A.
Interrupt	IRQ3, <b>IRQ4</b>
	Selects the IRQ for serial port A.
Serial Port B	Disabled, Enabled, <b>Auto</b>
	Setting at Enabled allows the user to configure the port.
	Setting at Auto enables the BIOS or operating system to configure the port.
Mode	<b>Normal</b> , IR
	Selecting Normal sets the port for normal use. IR not used for this configuration.
Base I/O Address	<b>2F8</b> , 3E8, 2E8, 3F8,
	Selects the base I/O address for serial port B.
Interrupt	<b>IRQ3</b> , IRQ4
	Selects the IRQ for serial port B.
Parallel Port	Disabled, Enabled, <b>Auto</b>
	Setting at Enabled allows the user to configure the port.
	Setting at Auto enables the BIOS or operating system to configure the port.
Base I/O Address	<b>378</b> , 278, 3BC
	Selects the base I/O address for the LPT port.

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## **Advanced Menu**

<b>Menu Item</b>	<b>Settings (default is bold)</b>
Interrupt	IRQ5, <b>IRQ7</b>  Selects the IRQ for the LPT port.
Mode	Output Only, Bi-directional, <b>ECP</b> , EPP  Selects parallel port mode.
DMA Channel	<b>DMA 3</b> , DMA 1  Sets the DMA channel for the parallel port.
Floppy Disk Controller	Disabled, <b>Enabled</b> , Auto  Setting at Enabled allows the user to configure the controller.  Setting at Auto enables the BIOS or operating system to configure the controller.
Game Port & Midi	<b>Auto</b> , Disabled, Enabled  Configures the Game Port  Enabled allows selection of Base I/O Address and Base I/O Address/IRQ.
Base I/O Address	<b>201</b> , 209, 211, 219  Game port address configuration.
Base I/O Address/IRQ	<b>330 IRQ_10</b> , 300 IRQ_5, 310 IRQ_10, 320 IRQ_5,  Address configuration for Midi port. The Midi port and Game port must be Enabled/Disabled at the same time.
Large Disk Access Mode	Other, <b>DOS</b>  Select DOS if using DOS operating system.  Select Other if using another operating system such as UNIX or Novell NetWare.
Local Bus IDE Adapter	Disabled, Primary, Secondary, <b>Both</b>  Enables the integrated local bus IDE adapter.
Advanced Chipset Control	Press <b>Enter</b> to access the following submenus.
Graphics Aperture	<b>64 Mb</b> , 128 Mb, 256 Mb, 4 Mb, 8 Mb, 16 Mb, 32 Mb  Selects the size of the Graphics Aperture for the AGP video device.
Enable memory gap	<b>Disabled</b> , Enabled  If Enabled, turn system RAM off to free address space for use with an option card.  Either a 128kb conventional memory gap, starting at 512kb, or a 1MB extended memory gap, starting at 15MB, will be created in system RAM.

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## **Advanced Menu**

<b>Menu Item</b>	<b>Settings (default is bold)</b>
ECC Error Type	<p><b>SMI</b>, SCI, None, NMI</p> <p>When a ECC error occurs, it generates an interrupt. Select the type of interrupt to report:</p> <ul style="list-style-type: none"> <li>NMI Non-Maskable</li> <li>SMI System Management</li> <li>SCI System Control</li> </ul>
SERR Signal Condition	<p><b>Multiple bit</b>, Both, None, Single Bit</p> <p>Select ECC error conditions that SERR# be asserted.</p>
Pool A Capacity	<p><b>8</b>, 1, 2, 4</p> <p>This field defines the maximum number of RDRAM devices that can reside in Pool A at a time. The devices that are not part of Pool A belong in Pool B.</p>
Pool A Active Device	<p><b>4</b>, 1, 2, 3</p> <p>This field defines the maximum number of RDRAM devices in Pool A that can be Active Read/Write or Active state at a time. The devices in Pool A that are not in Active state are in Standby state.</p>
Pool B Power State	<p><b>Nap</b>, Standby</p> <p>This field selects the operating state of the RDRAM devices in Pool B. All devices in Pool B are in Standby or Nap state.</p>
ACPI Standby State	<p><b>S1</b>, S3</p> <p>Choose one of the ACPI states.</p>
QuickBoot Mode	<p>Disabled, <b>Enabled</b></p> <p>When Enabled, allows the system to skip certain tests while booting. This decreases the time needed to boot the system.</p>
AC97 Audio	<p><b>Enabled</b>, Disabled</p> <p>Enables or disables the integrated Audio Interface.</p>
AC97 Modem	<p>Enabled, <b>Disabled</b></p> <p>Enables or disables the integrated Modem Interface.</p>
DMI Event Logging	<p>Press <b>Enter</b> to access the following submenus.</p>
Event Log Capacity	Status only.
Event Log Validity	Status only.
View DMI Event Log	Status only, press <b>Enter</b> to view the Event Log.
Clear All DMI Event Logs	<p><b>No</b>, Yes</p> <p>Selecting No prevents clearing out the DIMM event logs.</p> <p>Selecting Yes will clear the PMI event log after rebooting.</p>

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## **Advanced Menu**

<b>Menu Item</b>	<b>Settings (default is bold)</b>
Event Logging	<b>Enabled</b> , Disabled Selecting Enabled permits logging of DMI events.
ECC Event Logging	<b>Enabled</b> , Disabled Select Enabled to allow logging of ECC events.
Mark DMI Events As Read	Press <b>Enter</b> . Select <b>Yes</b> or No to "Mark all Events as read?"
Preboot Management	<b>Disabled</b> , Enabled Select Enabled to enable the Preboot Management function.
Default Primary Video Adapter	<b>AGP</b> , PCI Select PCI to have a PCI card, if installed, used for the boot display device. Select AGP to have the AGP card, if installed, used for the boot display device.
Hardware Monitor Control System Temperature CPU Temperature CPU Fan Speed Power Fan Speed System Fan Speed Vcore Voltage Vtt 1.5 Voltage +3.3V Voltage +5.0V Voltage +12V Voltage +5 Usb Voltage Battery Voltage	The BIOS detects the value for each of these categories automatically and monitors them accordingly.

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## **Security Menu**

Choose the Security Menu by selecting Security in the legend bar on the Main Menu screen. Other Security Menu options are available by selecting submenus.

Use the arrow keys to select one of the Security Menu options and press **Enter** to select a submenu. Items with grayed-out text are not available. Explanations of each Security Menu item are in the following table.

### **Security Menu Items**

<b>Menu Item</b>	<b>Settings (default is bold)</b>
Supervisor Password Is	<b>Clear</b> , Set Status only, user cannot modify. Supervisor password controls access to the BIOS Setup Utility.
User Password Is	<b>Clear</b> , Set Status only, user cannot modify. User password controls access to the system at boot.

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## **Security Menu Items**

<b>Menu Item</b>	<b>Settings (default is bold)</b>
Set Supervisor Password	Press <b>Enter</b> to access.  Use this field to set or change the supervisor password. Press <b>Enter</b> to bring up a dialog box where the password can be entered and confirmed.
Set User Password	Press <b>Enter</b> to access.  Use this field to set or change the user password. Press <b>Enter</b> to bring up a dialog box where the password can be entered and confirmed.
Security Mode	Press <b>Enter</b> to access the Security Mode.  Use this mode to select <b>Password</b> (default), SmartCard, or FingerPrint. Press <b>Enter</b> to open the selected field.  Use the SmartCard field to assign access to the SmartCard Reader by the supervisor and/or user. Press <b>Enter</b> to bring up the SmartCard Reader dialog box for setting up SmartCard security.  The Assign Supervisor SmartCard field controls Supervisor access to the BIOS Setup utility and the system. A PIN number controls access.  The Assign User SmartCard field controls user access to the system at boot. A PIN number controls access.
Password on Boot	<b>Disabled</b> , Enabled  When Enabled, requires password entry before boot. System remains in secure mode until password is entered.
Fixed Disk Boot Sector	<b>Normal</b> , Write Protect  Write Protect protects the boot sector on the hard disk from viruses.
Diskette Access	<b>Supervisor</b> , User  Controls access to the diskette drive.
Network Boot Setting	Press <b>Enter</b> to access.
Keyboard/Mouse Lock	Disabled, <b>Enabled</b>  Select Enabled to lock the keyboard and mouse when remote booting.
Virus Check Reminder	<b>Disabled</b> , Daily, Weekly, Monthly  Displays reminder message at bootup. Message is daily, every Monday, or first of every month.
System Backup Reminder	<b>Disabled</b> , Daily, Weekly, Monthly  Displays reminder message at bootup. Message is daily, every Monday, or first of every month.

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## Security Menu Items

Menu Item	Settings (default is bold)
Assign HDD Password	<p>Press <b>Enter</b> to access the Assign HDD Password Mode.</p> <p>Controls access to the system's hard drive by assigning master and user passwords. See "Hard Drive Security" later in this section for information and procedures for using the HDD password mode.</p> <p><b>CAUTION:</b> If the master and user password are set on a hard drive, they can never be removed. If the master password is forgotten and the hard drive is installed in another system, data cannot be accessed on the hard drive.</p> <p><b>Once these passwords are set, NEC Computers Inc. has no capability to remove them.</b></p>

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## Power Menu

Choose the Power Menu by selecting Power in the legend bar on the Main Menu screen. Other Power Menu options are available by selecting submenus.

Use the arrow keys to select one of the Power Menu options and press **Enter** to select a submenu. Items with grayed-out text are not available. Explanations of each Power Menu item are in the following table.

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**Note** Power management is only supported in systems running Windows 98 or Windows 2000.

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## Power Menu Settings

Menu Item	Settings (default is bold)
Power Savings	<p>Disabled, <b>Customized</b>, Maximum Power Savings, Maximum Performance</p> <p>Disabled setting turns off Power Management and disables Standby Timeout.</p> <p>Maximum Power Savings setting conserves the greatest amount of power.</p> <p>Maximum Performance setting conserves power but allows best system performance.</p> <p>Customized setting allows the user to modify the Auto Suspend Timeout and Hard Disk Timeout fields.</p>
Standby Timeout	<p><b>Off</b>, 2, 4, 6, 8, 12, 16 minutes</p> <p>Specifies the amount of time the system is in Idle Mode before entering the Standby Mode.</p>
Auto Suspend Timeout	<p><b>Off</b>, 5, 10, 15, 20, 30, 40, 60 minutes</p> <p>Specifies the amount of time the system is in standby before entering the sleep mode.</p>

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## **Power Menu Settings**

<b>Menu Item</b>	<b>Settings (default is bold)</b>
Resume On Time	<b>Off</b> , On  Setting to On allows the user to set the Resume Time field to a time when the system is to wake up.
Resume Time	00:00:00  When Resume on Time is set to On, the user can specify the time the system is to wake up.
Resume Date	When Resume on Time is On, the user can specify the date the system is to wake up.
Power Button Behavior	On/Off, Wake/Sleep  Select On/Off to turn the system On or Off.  Select Wake/Sleep to allow the system to enter sleep mode.
Power Loss Resume	<b>Keep Off</b> , Keep On, Keep Loss  Select the state after resume from power fail.
Keyboard Board Power On	<b>Disabled</b> , WIN98 KB, Hot-Key  Selecting WIN98 KB allows the user to set Mouse Power On to select left or right button to power on and to Forbid Power Button Power On.
Mouse Power On	<b>Disabled</b> , Enabled  Selecting Enabled allows user to select left or right button to power system on. Also allows user to select Click Configuration (double click or single click).
Resume On Modem Ring	<b>Off</b> , On  Setting to On allows the system to wake up when an incoming call is detected on the modem (if installed).
Resume on PME	<b>On</b> , Off  Enables the system to wake up by PME.

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## Boot Menu

Choose the Boot Menu by selecting Boot in the legend bar on the Main Menu screen. Other Boot Menu options are available by selecting submenus.

Use the arrow keys to select one of the Boot Menu options and press **Enter** to select a submenu. Items with grayed-out text are not available. Explanations of each Boot Menu item are in the following table.

### **Boot Menu Settings**

<b>Menu Item</b>	<b>Settings (default is bold)</b>
+Removable Devices +Hard Drives ATAPI CD-ROM Drive Network Boot	Sets the bootable device order.  Use the up or down arrow to select a device, then press the + or – key to move the device up or down the list.  Devices with a + in front of the device name can be expanded by pressing <b>Enter</b> . This shows a list of the devices.  To enable or disable a device, select the device and press <b>Shift + 1</b> .  To move a device between Removable Devices and Hard Drives, select the device and press the <b>n</b> key.  To remove a device that is not installed, select the device and press the <b>d</b> key.

## Exit Menu

Choose the Exit Menu by selecting Exit in the legend bar on the Main Menu screen. Other Exit Menu options are available by selecting submenus.

Use the arrow keys to select one of the Exit Menu options and press **Enter** to select a submenu. Explanations of each Exit Menu item are in the following table.

### **Exit Menu Items**

<b>Menu Item</b>	<b>Settings (default is bold)</b>
Exit Saving Changes	Implements the changes just made, and exits BIOS.
Exit Discarding Changes	Exit leaving BIOS unchanged.
Load Setup Defaults	Loads default values for all BIOS setup fields.
Discard Changes	Load previous values from BIOS for all setup fields.
Save Changes	Saves all setup value changes to BIOS.

---

## Hard Drive Security

The NEC PowerMate CT system allows establishing password protection for the internal hard drive. Hard disk drive (HDD) password protection restricts access to the drive *only* if the drive is removed from the PowerMate CT system and installed in another system. The system does not prompt you to enter your HDD passwords while the drive remains in the current system.

The HDD passwords are written to the system BIOS and to the hard drive to ensure that the password protection travels with the drive if it is moved to another system.

### Establishing Hard Disk Drive Passwords

To establish password protection for the system's hard drive, you must establish a master password, establish a user password, and enable the established passwords for the internal hard drive. Use the following procedure to establish HDD passwords and to enable HDD password protection.



**CAUTION** If you set the master and user password on a hard drive, you can never remove the passwords. You can change the passwords. If you forget the master password and install the drive in another system, you cannot access the data on the hard drive.

**Once you set these passwords, NEC Computers Inc. has no capability of removing them.**

If you install the hard drive in another PowerMate system with hard disk drive security enabled, you must enter the password to allow access to the hard drive. **If this PowerMate system does not support hard disk drive security, you cannot access the data on the hard drive.**

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1. Boot your system. Press **F2** when prompted to enter BIOS Setup. The Main Menu screen appears.
2. Using the arrow keys, select the Security Menu.
3. Use the down arrow key to highlight **Assign HDD Password** and press **Enter**. The system prompts you to enter a master password.
4. Enter a master HDD password and press **Enter**. The system prompts you to reenter the password to verify.
5. Reenter the master HDD password and press **Enter**. The system confirms the creation of the master password and prompts you to enter a user password.
6. Enter a user password and press **Enter**. The system prompts you to reenter the password to verify.
7. Reenter the user password and press **Enter**.
8. Highlight and select **Primary Master HDD Password**. Use the + (plus) and – (minus) keys to enable the selection. (This enables password protection for the internal HDD.)

### Changing Hard Disk Drive Passwords

Use the following procedure to change hard disk drive passwords.

1. Boot your system. Press **F2** when prompted to enter BIOS Setup.
2. At the Main Menu screen, select the Security Menu.

- 
3. Highlight **Assign HDD Password** and press **Enter**.
    - If you enter the current master password, you are prompted to enter a new master password.
    - If you enter the current user password, you are prompted to enter the new user password.
    - If you do not want to establish a new master or user password, press **Esc** instead of entering a new password.
  4. Save the changes and exit BIOS Setup.

### ***Using Hard Disk Drive Password Protection***

To facilitate the transfer of one or more HDDs between systems, establish a single master password (and store the password in a secure place). Forgetting the master password results in the inability to access the data on the hard drive. Establish different user passwords to limit access to specific systems.



**CAUTION** If you set the master and user password on a hard drive, you can never remove the passwords. You can change the passwords. If you forget the master password and install the drive in another system, you cannot access the data on the hard drive.

**Once you set these passwords, NEC Computers Inc. has no capability of removing them.**

If you install the hard drive in another PowerMate system with hard disk drive security enabled, you must enter the password to allow access to the hard drive. **If this PowerMate system does not support hard disk drive security, you cannot access the data on the hard drive.**

---

With hard disk drive security enabled on the original NEC PowerMate CT system, the system boots normally.

If you install the hard drive in another NEC PowerMate system with security enabled, you must enter the master password to access the hard drive. If the hard drive is installed in another NEC PowerMate CT system with security disabled, the system prompts you to enter the master password and then a new user password.

### ***Moving the Hard Drive***

When a password protected hard drive is moved from its original system and installed in another system, error messages appear indicating that the drive is locked. Next, the Security Setup screen appears requiring the user to enter the master password to unlock the drive. Enter the master password, when prompted.

To take advantage of HDD password protection in another system, the system must be equipped with the same HDD password protection feature. To determine if the system has HDD password protection, check the Security Menu in the BIOS Setup to see if there are provisions for establishing HDD passwords.

---

## ***FLASH Utility***

The system BIOS resides on a flash read only memory (ROM) chip in your system. The FLASH ROM can be updated using the following procedure. Before starting the BIOS update, NECC recommends that you first contact NECC for assistance (see Section 8 for contact information).

Update the FLASH ROM with a BIOS FLASH diskette. The diskette contains the latest version of the BIOS code. You can get the diskette from NECC or download the BIOS from the NECC website. See Section 8 for download and website information.

Update the BIOS from the BIOS FLASH diskette as follows.

1. Write down the BIOS Setup parameters currently set on your system.
2. Turn off the system.
3. Put the flash diskette in drive A, and turn on the system.
4. When the flash upgrade menu appears, choose **Update Flash Memory Area from a file**.
5. When the menu asks you to enter a path/filename, use the arrow keys to select the “.bio” file and press **Enter**.
6. The utility asks for confirmation to load the new flash into memory. Select **Continue with Programming**.
7. After the upgrade completes, remove the diskette.
8. Reboot the system and start the Setup program. Press **F9** to reset the BIOS defaults. Use the recorded Setup selections you made at the beginning of this procedure to set the parameters.

## ***Online Documentation***

NECC provides Online Documentation that can be accessed directly from an icon on the windows desktop. The Online Documentation provides quick access to information about the computer.

The Online Documentation includes the following modules.

- **Preface**  
Provides navigating pointers, text conventions, legal information, safety notices, and information on setting up a healthy work environment.
- **Introducing your PowerMate CT**  
Describes front and back features, the diskette drive, and important information about your system.
- **Using your PowerMate CT**  
Provides pointers on system care, productivity, and system operation.
- **System Guide**  
Includes information about the system board and BIOS settings, includes pointers on upgrading system components, and provides system specifications and error messages.
- **Installing Devices**  
Provides safety precautions, instructions on removing and replacing system components including covers, 3 1/2-inch and 5 1/4-inch devices, the system board, and optional features and accessories. Also provides configuration information.

- 
- Solving Problems  
Provides a troubleshooting guide, with categories including
    - Problems After the System Has Been Running Correctly
    - Problems at Initial System Start-up
    - Problems Running New Application Software
    - Problems Operating Add-in Cards
    - Problems and Suggestions and Beep Codes and Error Messages.

To open the Online Documentation double click the **Online Documentation** icon on the Windows desktop. Alternately, to open the Online Documentation click **Start**, point to Programs, and click **Online Documentation**.

To uninstall or reinstall the Online Documentation, use the Smart Restore Program, if available. The Smart Restore Program is used in conjunction with the Product Recovery CD. See the following section, “Product Recovery Program” for instructions on using the Smart Restore Program.

## ***Product Recovery Program***

The PowerMate Product Recovery program offers the possibility to go back to the original software shipped on your system. You can reinstall valuable software with the original hardware settings shipped from the factory. The recovery kit includes:

- PowerMate Recovery Boot diskette
- Product Recovery CD-ROM.



**CAUTION** Use the Recovery program only in the unlikely event of file deletion or file corruption. The Recovery program is a very powerful tool. Some options permanently delete all the data on your hard drive.

Before using the Recovery program, we recommend that you try to use the Smart Restore program to reinstall the faulty software or hardware. Smart Restore lets you reinstall software without deleting any files. See “Using the Smart Restore Program” later in this document.

---

Before using the Recovery program, read the following sections carefully.

### ***Starting the Recovery Program***

Start the Recovery program as follows:

1. With the system power off, insert the Recovery Boot diskette into the diskette drive.
2. Turn on system power.
3. Insert the Product Recovery CD into the CD-ROM drive.
4. When a warning message appears, read it carefully. Press **Enter** to continue or **Esc** to exit the Recovery program.

---

## Using the Recovery Program

The Recovery Program main menu offers the following options:

- Standard System Restore – select this option to restore your system to its original factory software and settings.
- Advanced Options – select this option to only install the Microsoft Windows operating system.
- Tools – choose this option to access the MS-DOS<sup>®</sup> edit mode, a series of hard disk utilities, and a Master CD check program.
- Cancel to return to DOS – select this option to close the Recovery program and exit to MS-DOS mode.

### Standard System Restore

The Standard System Restore recovery option resets your system to the original factory settings. All files that were on the hard drive when you purchased the system are restored. All the files you added or created yourself and all changes made to the original files are lost after the recovery process. Your hard disk is exactly the same as when it left the factory.



**CAUTION** Before you begin the restoration process, back up your data files (for example, your document and art files) onto storage disks such as Zip disks or onto a network drive.

---

1. Start the Recovery program (see “Starting the Recovery Program” earlier in this document).
2. At the Recovery Program main menu, choose Standard System Restore.

The first part of the restoration process takes about a half hour. Do not remove the Recovery Boot diskette from the diskette drive. Do not shut down the system.

3. At the message informing you that the restoration process is finished, remove the Recovery Boot diskette and the Product Recovery CD from their drives. Press **Enter** to restart your system.

The system restarts and installs the Windows operating system. This procedure can take as long as an hour to complete. During this time, the system reinstalls all the original software and hardware configuration settings.

4. When the installations are finished, perform the same procedures as when you turned on your computer for the first time.

### Advanced Options

The Advanced Options menu lets you choose to reinstall only the Windows operating system or to make changes to Windows Setup.



**CAUTION** The Advanced Options are only for use by an advanced PC user or qualified technician. If you are not completely sure that you want to continue, choose the Cancel option by pressing **Esc** or by pressing **3** on your numeric keypad.

---

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Advanced Options are as follows:

- **Reinstall Windows Only**  
This process formats the hard drive and performs a new installation of the Windows operating system with the minimum settings. All data, including your personal files, are permanently deleted. Before you begin this process, back up your data files.
- **Windows Setup (Windows 98 only)**  
This process runs Microsoft Windows Setup which reinstalls your operating system.

## *Tools*

The Tools menu includes a series of advanced tools to maintain the hard drive and to check the Product Recovery CD for potential errors.

---

 **CAUTION** The Tools options are only for use by an advanced PC user or qualified technician. If you are not completely sure that you want to continue, choose the Cancel option by pressing **Esc** or by pressing **3** on your numeric keypad.

---

Tools include the following options:

- **Edit**  
Runs the Microsoft MS-DOS editor for writing, editing, and modifying MS-DOS program files.
- **ScanDisk**  
Runs Microsoft ScanDisk. This program checks your hard drive and helps you fix common file and disk errors.
- **FDisk**  
Runs the hard disk partition manager utility. Inappropriate use of FDisk can result in an irreversible loss of all data on the hard drive.
- **Format Hard Drive**  
Performs a quick format of the computer's hard disk. Inappropriate use of the Format command can result in an irreversible loss of all the data on the hard drive.
- **Master CD Check**  
Checks for errors on the Product Recovery CD. If the Master CD Check reports a Master CD error, contact NECC Technical Support.

## *Using the Smart Restore Program*

Some systems have access to a Smart Restore program. Smart Restore lets you select which applications you wish to (re-)install or remove. When you select to install applications, Smart Restore does not destroy data on your hard drive, other than replacing old copies of the application. When you remove an application, Smart Restore removes all the files of the selected application. Smart Restore also allows you to (re-)install hardware settings.

## *How to Load Smart Restore*

To load Smart Restore, click the Windows **Start** button, select **Programs, Tools, and Restore**.

If you have not already placed the Product Recovery CD into the CD-ROM drive, do so now. After the application loads, Smart Restore displays the main menu with a Software tab, a Hardware tab, and (in some systems) a Tools tab.

---

## *Software Restore or Removal*

Select the Software tab on the main menu to restore or remove specific applications:

- Click on one or more programs to select them. Smart Restore indicates a selected program with a green check mark in front of it. Deselect a selected program by double clicking it.
- Click on the **Select All** button if you want to select all of the listed programs.
- To remove a program, double click it. A red cross in front of the program indicates it has been selected for removal. To deselect the program, click on it again.

## *Hardware Settings*

Select the Hardware tab on the main menu to restore hardware settings:

- Click on one or more devices to select them. Smart Restore indicates a selected device with a green check mark in front of it. To deselect the device, click on it again.
- Click on the **Select All** button if you want to select all of the listed devices.

## *Restoration Process*

Once you have selected the programs or hardware settings you want to restore, click **OK** to start the restoration process.

Each application or device you selected runs through its installation procedure. Continue as with a normal installation, selecting the options you want. Each time the application asks you if you wish to restart your system, select **Yes** to ensure all registry information is correct for the next installation.

When all the selected programs or devices are installed, remove the Product Recovery CD and store it in a safe place.

## *PowerMate Driver CD*

The PowerMate Driver CD provides drivers for peripheral equipment that is available for purchase to use with your PowerMate system. The equipment and the drivers are fully tested by NECC to ensure their compatibility with the PowerMate system. If you need drivers for peripheral devices you are adding to your system, use this CD.

The PowerMate Driver CD is easy to use. Start the system, and then insert the PowerMate Driver CD. Follow the on-screen prompts to install the required drivers.

## *Intel Processor Serial Number Control Utility*

The Intel Processor Serial Number Control Utility is a Windows program that enables or disables the reading of the Pentium III processor serial number by software. This function lets you control which software programs or websites have permission to read the processor serial number. When installed, the utility runs automatically each time the system powers on.

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**Note** The Intel Processor Serial Number Control Utility is for use with systems shipping with the Intel Pentium III processor. Installing this utility on a system that does not contain a Pentium III processor generates an error message.

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This utility places an icon in the Windows system tray. The icon provides a visual status of the processor serial number. You have the option of hiding the system tray icon. You can enable or disable the processor serial number at any time. However, enabling the serial number requires restarting the system.



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The following information describes:

- system requirements
- installation procedures
- processor serial number features
- Frequently Asked Questions
- technical support.

## ***System Requirements***

The Intel Processor Serial Number Control Utility requires:

- a Pentium III processor-based system
- Windows 98, Windows 2000, or Windows NT 4.0 (or later)
- 2 megabytes of hard drive space.

## ***Installation***

The Intel Processor Serial Number Control Utility (version 1.0) comes already installed on the system. The system ships with the processor serial number feature turned off.

## ***Processor Serial Number***

The Intel processor serial number, a feature of the Pentium III processor, is an identifier for the processor. The processor serial number is unique, and when used in conjunction with other identification methods, can be used to identify the system or user. This number can be used in a wide variety of applications that benefit from stronger forms of system and user identification.

The processor serial number is analogous to a conventional serial number, with these important differences:

- A software application can read the processor serial number.
- You can enable or disable the reading of the serial number via utility programs such as this one, or via the BIOS, depending on the system configuration.

For additional information about the Pentium III processor and the processor serial number, visit [www.intel.com/pentiumiii](http://www.intel.com/pentiumiii).

## ***Frequently Asked Questions***

### **What are the benefits of the processor serial number?**

You can use the processor serial number in applications that benefit from stronger forms of system and user identification.

### **Why would I want to turn off my processor serial number?**

Intel believes the processor serial number can provide compelling benefits to users. They are developing features in conjunction with the processor serial number to allow responsible service providers to provide services that maintain your privacy. However, if you are concerned that a given application/service using your processor number might impact your privacy, you can turn off the processor serial number using the utility.

---

### **What is the default state of the processor serial number?**

The default state of the processor serial number is on, until the Processor Serial Number Control Utility is installed. Once the Processor Serial Number Control Utility is installed, it turns the processor serial number off by default. You can use the utility to turn on the processor serial number.

### **Can a website read my serial number without my knowledge?**

No, generally not. Websites cannot read serial numbers unless you allow them to download a program that can read the processor serial number. Almost all browsers are configured to warn users whenever they download executable software. Unless you disable the warning in the browser, you should receive a notification.

### **Does Intel track serial numbers?**

Generally not, other than related to the manufacturing process. Intel does not, in the absence of advance and express consent of a user, collect serial number data that is otherwise identified with a user.

### **Which programs and/or websites currently use the processor serial number?**

You can find a complete list of programs that can take advantage of the processor serial number and other new capabilities of the Pentium III processor at <http://www.intel.com/pentiumiii/utility.htm>.

### **How can I tell if my processor serial number is turned on?**

The vast majority of Pentium III processor-based systems ship with the processor serial number enabled. The control utility allows you to check the status by:

- Viewing the icon itself. The disabled icon shows a red circle with a white “x.”
- Clicking the task tray icon and selecting the “Status” menu item. Or you can select the menu from the tool tip shown when you position the mouse over the task tray icon.

## ***Intel Technical Support***

For world wide 7 days a week, 24 hours a day technical support, please visit the Intel support website at <http://support.intel.com>.

Email: [support@intel.com](mailto:support@intel.com).

In the United States, call **800-628-8686** from 5:00 a.m. to 5:00 p.m. Pacific Standard Time.

For world wide phone contacts, please see <http://support.intel.com/support/feedback.htm>.

# 3

## Disassembly and Reassembly

- System Covers
  - Expansion Boards
  - RIMM Memory Modules
  - Processor
  - 5 1/4-Inch Accessible Drives
  - 3 1/2-Inch Accessible Drives
  - 3 1/2-Inch Internal Drives
  - CMOS Battery
  - System Board
  - Power Supply
  - Front USB Port
  - Front LED/Switch Bracket
  - Chassis Intrusion Switch
  - Minitower and Desktop Setup
  - Chassis Shell
-

---

This section contains step-by-step disassembly procedures for the PowerMate CT system. A disassembly figure is provided with most procedures. For an illustrated parts breakdown and parts list, see Section 5, “Illustrated Parts Breakdown.”

For complete disassembly of the system, follow the disassembly order listed in the following table. To reassemble, follow the table and procedures in reverse order. Where reassembly is not apparent, reassembly procedures are provided.

A small flat head screwdriver, Phillips-head screwdriver, and needle nose pliers are the only required tools.

### ***PowerMate CT System Disassembly Sequence***

<b>Sequence</b>	<b>Part Name</b>	<b>See Page</b>
1	System covers	3-3
2	Expansion boards	3-6
3	RIMM memory modules	3-12
4	Processor	3-16
6	5 1/4-inch accessible devices	3-18
7	3 1/2-inch accessible devices	3-24
8	3 1/2-inch internal drives	3-26
9	CMOS battery	3-30
10	System board	3-31
11	Power supply	3-33
12	Front USB port	3-34
13	Front LED/switch bracket	3-34
14	Chassis intrusion switch	3-36
15	Minitower and desktop setup	3-37
16	Chassis shell	3-40

When disassembling the system, follow these general rules.

- Turn off the system and unplug the AC power cord.
- Disconnect all peripherals before disassembling the system.
- Before opening the system or handling boards or chips, touch the frame to discharge static.
- Do not disassemble parts other than those specified in the procedure.
- The system uses several types of screws. Be sure to note the type of screw being removed. Use the same type when assembling the system.
- Label any connector before disconnecting it. Note where the connector goes and in what position it was installed.
- Use care in disconnecting cables. To prevent cable breakage, pull only on the connector. Do not pull on the cable.
- When installing a cable, route the cable so it is not pinched by other components and is out of the path of the cover.

---

On completion of any reassembly, perform a power-on test. If a fault occurs, verify that the reassembly was performed correctly.

## System Covers

The following sections describe how to remove and replace the following system unit covers:

- system cover
- front panel.

### Removing the Cover

Before installing optional hardware inside your system, you must first remove the cover from the system unit.

---

**! WARNING** Before removing the cover, turn off system power and unplug the system power cable. Power is removed only when the power cable is unplugged.

---

1. Turn off and unplug the system unit.
2. Disconnect any external devices (such as a keyboard and monitor) from the front or rear of the system unit.

---

**! CAUTION** Electrostatic discharge can damage computer components. Discharge static electricity by touching a metal object before removing the cover.

---

3. If the system unit is in the upright (minitower) position, place it on its right side (the side with four rubber feet).
4. If you have a padlock in the locking tab on the rear of the chassis, remove it.
5. Remove the two thumbscrews holding the cover to the rear of the chassis.

#### Locating the Cover Screws



**A** – Cover  
**B** – Cover Screws

**C** – Locking Tab

6. Grasp the handle on the cover and slide the cover towards the rear of the chassis about an inch (see the following figure).
7. Lift the cover off the system and set aside.

---

### Removing the Cover



### Replacing the Cover

Replace the cover as follows.

---

**CAUTION** Ensure that all cables inside the chassis are positioned to prevent crimping, abrasion, or cutting while installing the cover. Check that the ribbon cables are folded along their fold lines and out of the direct path of the cover.

---

1. Position the cover over the side of the chassis so that the back edge of the cover is about an inch beyond the back edge of the chassis (see the following figure).
2. Align the tabs and slots on the cover with those along the edges of the chassis.
3. Align the locking tab slot at the bottom rear of the cover with the locking tab.

### Replacing the Cover



A – Side Slots and Tabs  
B – Locking Tab (hidden)

C – Front Slots and Tabs

- 
4. Firmly press the cover against the chassis and slide the cover towards the front of the chassis until it locks in place.

---

**Note** If the cover does not slide all the way to the front of the chassis, check that the cover tabs at the front of the cover are properly inserted into their slots in the chassis. Check that the locking tab is inserted into its slot on the back edge of the chassis. Also check that the tabs are not bent closed. If they are, open them slightly.

---

5. Replace the two previously removed thumbscrews.
6. If you have a padlock for the locking tab on the rear edge of the chassis, install it.
7. If the system is set up for use as a minitower, place the system unit upright.
8. Reconnect all external peripherals.
9. Plug in the power cables.

### ***Removing the Front Panel***

Remove the front panel if you are installing an internal 3 1/2-inch hard drive or installing a device in one of the accessible device bays.

Remove the front panel as follows.

1. Remove the cover (see “Removing the Cover” earlier in this section).
2. Position the system on its side on your work table, with the front panel over the edge of the table.
3. Working from inside the chassis, press up on the two front panel locking tabs to release them from their slots on the edge of the chassis (see the following figure for tab locations).
4. On the right side of the front panel, at the top corner, press in on the panel to release the top.
5. Pull out the top of the front panel while pulling up on the panel to release it from the chassis. Set the panel aside.

#### ***Removing the Front Panel***



**A** – Chassis Slots

**B** – Locking Tabs

6. If you are removing or installing a device, see one of the following sections.
  - “Replacing 5 1/4-Inch Accessible Devices”
  - “Replacing 3 1/2-Inch Accessible Devices”
  - “Replacing Internal Drives.”

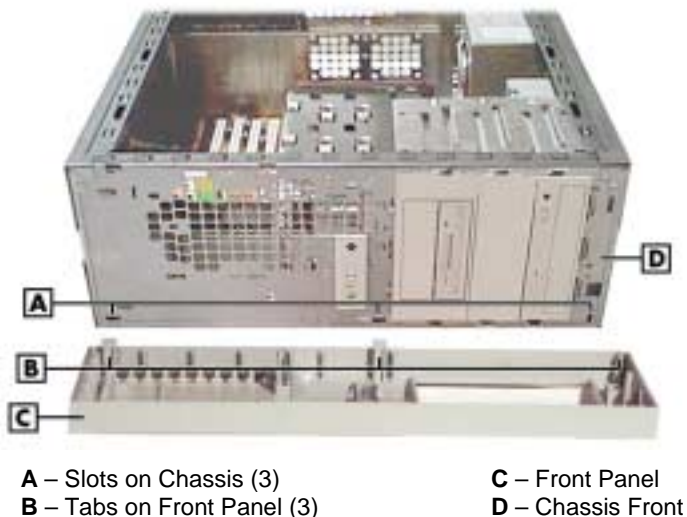
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## Replacing the Front Panel

Replace the front panel as follows.

1. Align the three tabs (**B**) on the inside edge of the front panel with their corresponding slots (**A**) on the lower edge of the chassis (see the following figure).
2. Insert the tabs into their slots and press the front panel up against the chassis until the front panel locks in place.
3. Replace the cover (see “Replacing the Cover” earlier in this section).

### Replacing the Front Panel



## Expansion Boards

The following sections describe how to:

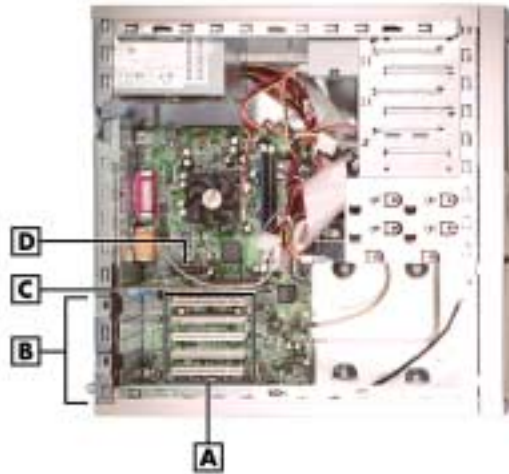
- remove and replace the retainer bar, which secures expansion boards and slot covers
- remove and replace expansion boards
- remove and replace slot covers.

The following figure shows the locations of the expansion slots on the chassis and the expansion board connectors on the system board.



---

## Locating Expansion Board Slots and Connectors



A – PCI Expansion Board Connectors  
B – PCI Expansion Board Slots

C – AGP Board Connector  
D – AMR Board Connector

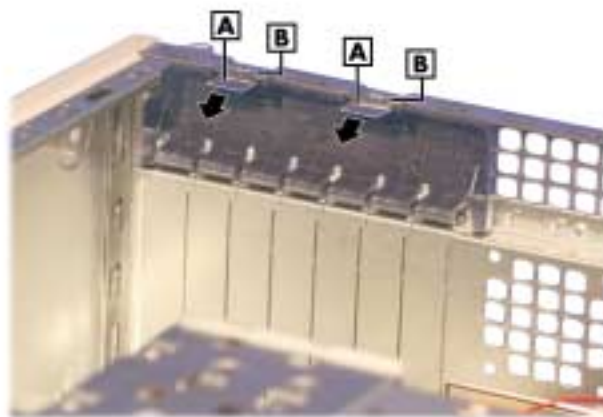
### Removing the Retainer Bar

Expansion boards and slot covers are held in place by a retainer bar. Remove the retainer bar before removing or replacing expansion boards or slot covers.

Remove the retainer bar as follows.

1. Remove the cover (see “Removing the Cover” earlier in this section).
2. Press down on the two tabs on the retainer bar to release the tabs from their slots (see the following figure).
3. Carefully remove the bar from the chassis.

### Removing the Expansion Board Retainer Bar



A – Retainer Bar Tabs

B – Tab Slots

4. If you are removing an expansion board, see “Removing an Expansion Board.”
5. If you are adding an expansion board, see “Replacing an Expansion Board.”
6. To replace the retainer bar, see “Replacing the Retainer Bar” later in this section.

---

## ***Removing an Expansion Board***

Remove an expansion board as follows.

1. Remove the cover (see “Removing the Cover” earlier in this section).
2. Label and unplug any cables connected to the board.
3. Remove the retainer bar (see “Removing the Retainer Bar”).
4. Pull the board out of the connector and expansion slot. Set the board on an antistatic surface.

If you are removing an AGP board, press out on the board’s locking lever while pulling the board out of its connector.

### ***Removing an Expansion Board***



**A** – Expansion Board

**B** – AGP Video Board Locking Lever

5. Install a new board, or install the slot cover if you are not installing a board.
  - If you are adding an expansion board, see “Installing an Expansion Board.”
  - If you need to install a slot cover, see “Installing a Slot Cover.”

---

## ***Installing a Slot Cover***

Install a slot cover as follows.

1. Slide the slot cover into the expansion board slot (see the following figure).  
Make sure the narrowed end of the slot cover goes into the metal strap. Its top edge should fit around the raised hole in the edge of the chassis.
2. Replace the expansion board retainer bar (see “Replacing the Retainer Bar” later in this section).
3. Replace the cover (see “Replacing the Cover” earlier in this section).

### *Installing a Slot Cover*



A – Slot Cover

## ***Removing a Slot Cover***

Remove a slot cover as follows.

1. Slide the slot cover up to free it from the chassis (see the previous figure).
2. Save the slot cover for future use.
3. Install an expansion board (see “Installing an Expansion Board”).
4. Secure the expansion board in place with the retainer bar (see “Replacing the Retainer Bar”).
5. Attach any signal cables required by the expansion board.
6. Replace the cover (see “Replacing the Cover” earlier in this section).

---

## ***Installing an Expansion Board***

Install an expansion board as follows.

1. Remove the cover (see “Removing the Cover” earlier in this section).
2. Follow any preinstallation instructions that come with the expansion board (such as setting jumpers on the board).
3. Remove the retainer bar that secures the expansion boards (see “Removing the Retainer Bar”).
4. If you need to remove an old expansion board from the connector designated for the new board, see “Removing an Expansion Board.”

If a slot cover is in the slot, remove it (see “Removing a Slot Cover”). Save the slot cover for future use.

5. Hold the new expansion board by its edges or its bracket and insert it into the expansion slot. If installing an AGP video board, lock the board in place with the locking lever (see the following figure).

### ***Installing an Expansion Board***



**A** – Expansion Board

**B** – AGP Video Board Locking Lever

6. Press the board firmly into the expansion slot connector on the system board.
7. Secure the expansion board in place with the retainer bar (see “Replacing the Retainer Bar”).
8. Attach any signal cables required by the expansion board.
9. Replace the cover (see “Replacing the Cover” earlier in this section).

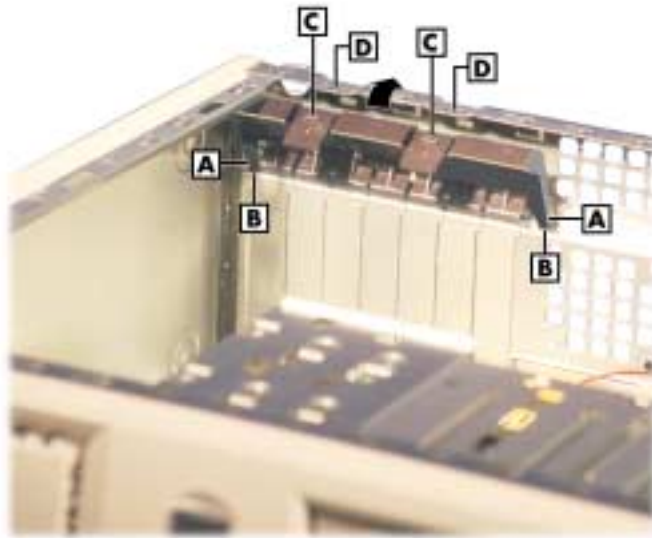
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## ***Replacing the Retainer Bar***

Install the retainer bar as follows.

1. Hold the retainer bar at an angle and insert the ends (**A**) into the slots (**B**) in the chassis (see the following figure).
2. Push the bar into the slots and under the edge of the chassis.
3. Press down on the lock tabs (**C**) and firmly push the bar in until the tabs slide into their slots (**D**). Be sure that the raised portion on each tab locks into the slot (**D**).
4. Replace the cover (see “Replacing the Cover”).

### *Replacing the Retainer Bar*



**A** – Retainer Bar End  
**B** – Retainer Bar Slot

**C** – Lock Tab  
**D** – Lock Tab Slot

---

## RIMM Memory Modules

See the following sections for procedures on removing or installing a RIMM memory module or a continuity module. See Section 4, “System Boards,” for RIMM module upgrade paths and guidelines for selecting RIMM modules.

### Removing a RIMM or Continuity Module

Remove a RIMM module or a continuity module as follows.

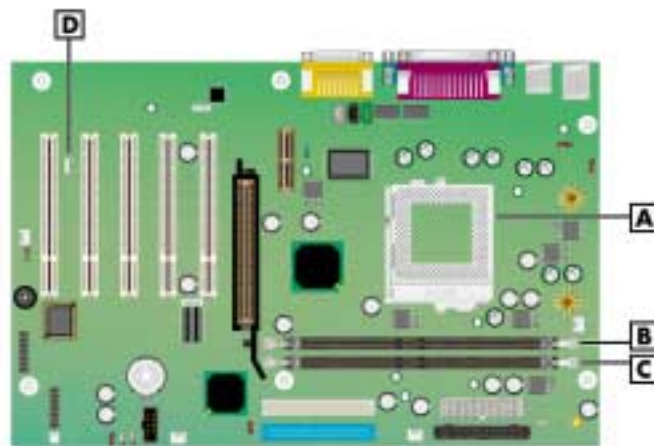
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**⚠ CAUTION** Before opening the system and before handling boards or RIMM memory modules, reduce static discharge by touching the chassis.

---

1. Remove the cover (see “Removing the Cover” earlier in this section).
2. Locate the RIMM memory sockets on the system board (see the following figure).

*Locating the RIMM and Processor Sockets*



A – Processor Socket                      C – RIMM 2 Socket  
B – RIMM 1 Socket                      D – Wake-On LAN (WOL) Connector

3. Eject a RIMM module or continuity module by pressing the plastic clips at the outer edges of the socket away from the module (see the following figures).

For module identification, note that the RIMM module is taller than the continuity module and has a cover over the memory on the module. Also note that the continuity module has no memory installed on it.

---

**⚠ CAUTION** If the system was just turned off, the RIMM module might be hot to the touch. Use caution in removing the module to avoid a burn.

---

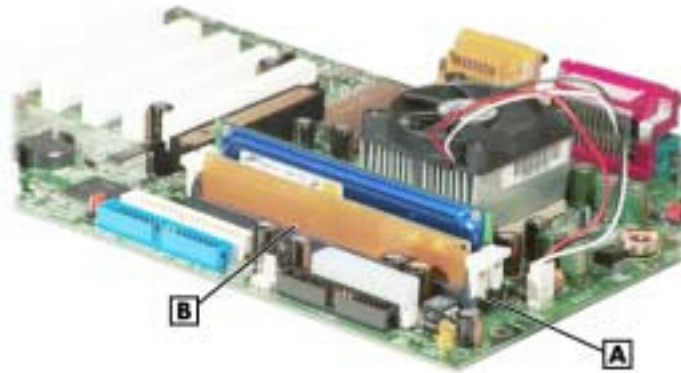
4. Grasp the center of the module and pull it straight up and out of the socket. Store the module in an anti-static bag.
5. As required, install a replacement RIMM or continuity module (see “Installing a RIMM or Continuity Module” in the next section).

---

**⚠ CAUTION** Ensure that both RIMM sockets are filled with two RIMM modules or one RIMM module and one continuity module. If both sockets are not filled, system memory won't work well or at all.

---

### *Removing a Continuity Module*



A – Plastic Clip (2)

B – Continuity Module

### *Removing a RIMM Module*



A – Plastic Clip (2)

B – RIMM Module

---

## ***Installing a RIMM or Continuity Module***

Install a RIMM module or a continuity module as follows.

1. Remove the cover (see “Removing the Cover” earlier in this section).
2. If you need to remove a currently installed RIMM or continuity module, see “Removing a RIMM or Continuity Module” earlier in this section.



**CAUTION** Before you install a module, reduce static discharge by touching the chassis.

---

3. Grasp the new module in the middle and align the notches on the new module with the keys in an empty RIMM socket (see the following figures).
4. Press the module firmly into the socket.
5. Make sure the locking clips at both ends of the module click closed.



**CAUTION** Ensure that both RIMM sockets are filled with two RIMM modules or one RIMM module and one continuity module. If both sockets are not filled, system memory won't work well or at all.

---

6. Replace the cover (see “Replacing the Cover” earlier in this section).

---

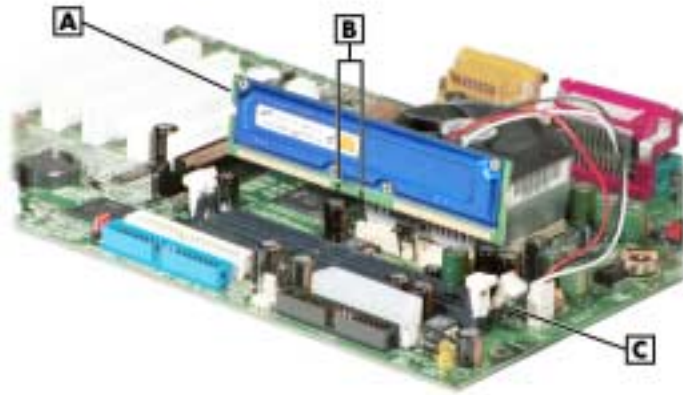
**Note** If you find a discrepancy in the amount of memory displayed at the Power-On Self-Test or in Windows with the amount of memory that you installed, check that you installed the memory modules correctly.

---



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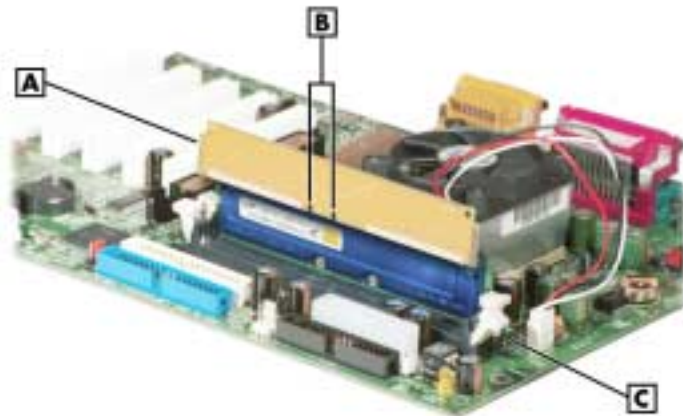
*Installing a RIMM Module*



**A** – RIMM Module  
**B** – Notches

**C** – Plastic Clip (2)

*Installing a Continuity Module*



**A** – Continuity Module  
**B** – Notches


**C** – Plastic Clip (2)

---

## Processor

The system board has a Socket 370 for mounting a Celeron or Pentium III processor.

---

 **CAUTION** Incorrect installation of the processor and heat sink can damage the processor, system board, or both. Carefully follow the installation instructions provided with the upgrade processor and the procedures in the following sections.

Ensure that you have the correct heat sink for the processor being installed. Do not use the heat sink from the removed processor.


---

To remove the processor from the socket, see “Removing the Processor.” To install the upgrade processor, see “Installing an Upgrade Processor.”

### Removing the Processor


Remove the processor from its socket on the system board as follows.

---

 **CAUTION** Before handling components, reduce static discharge by touching the chassis.

1. Remove the cover (see “Removing the Cover” earlier in this section).
2. Locate the processor socket on the system board (see the figure “Locating the RIMM and Processor Sockets” earlier in this section).

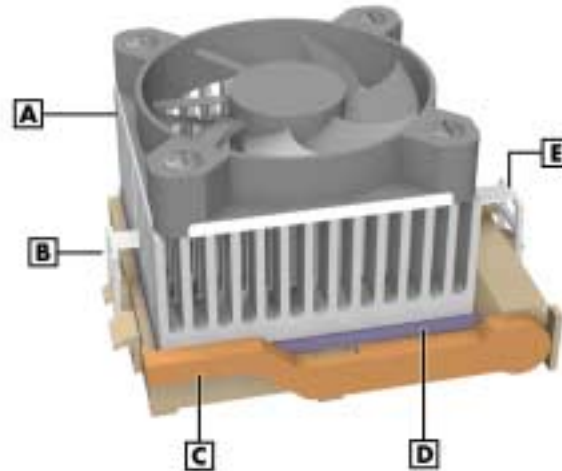
---

 **WARNING** If the system was just running, the processor and heat sink on the system board are hot. To avoid a burn, let the components cool before continuing.

3. Tag and unplug the cooling fan cable from its connector (CPU Fan) on the system board.
4. Remove the fan, heat sink, and retention clip from the processor as follows (see the following figure).
  - Simultaneously press down on the flange on the end of the retention clip while carefully pulling out the end to unhook it from the tab on the processor socket.
  - Unhook the retention clip from the tab on the opposite side of the processor socket.
  - Remove the fan, heat sink, and retention clip from the processor.
5. Remove the processor as follows.
  - Pull out on the processor socket lock lever just enough to release the lever from the socket, then pivot the lever up to release the processor.
  - Carefully lift up on the processor and remove it from the socket. Store the processor in a static-free bag.
6. Install the upgrade processor (see “Installing the Upgrade Processor” in the next section).

---

## Removing the Fan, Heat Sink, and Processor



A – Heat Sink  
B – Retention Clip  
C – Locking Lever

D – Processor  
E – Retention Clip Flange

## Installing an Upgrade Processor

Install the upgrade processor as follows.

1. Remove the processor currently in the system (see “Removing the Processor” in the previous section).

---

**⚠ CAUTION** Before picking up the processor, reduce static discharge by touching the metal chassis.

---

2. Align the triangle on the corner of the processor with the letters “CPU1” on the system board.
3. Carefully align the processor pins with the socket pin holes and set the processor into the socket.
  - If aligned correctly and the pins are not bent, the processor seats in the socket without forcing.
  - If the processor does not seat, check for correct alignment and bent pins.
4. Pivot the lever down and press it in towards the socket until it locks in place.

---

**⚠ CAUTION** Using the wrong heat sink or no heat sink can damage the processor, system board, or both. Ensure that the update processor has the correct heat sink (refer to the documentation that comes with the kit).

---

Additional information can be obtained from NECC (see Section 8, “NEC Information Services” for information on contacting NECC).

---

- 
5. Install a replacement heat sink and fan as follows and in accordance with the procedures contained in the heat sink kit.
    - If the kit includes a thermal pad, center it on top of the processor.
    - Align the heat sink and fan assembly with the processor and set it down on the processor (see the previous figure for alignment).
    - Attach the heat sink retention clip by hooking the non-flange end of the clip over the socket tab.
    - Press the opposite end of the clip over the tab on the socket until it snaps in place.
  6. Plug the cooling fan cable into its connector (CPU Fan) on the system board.
  7. Replace the cover (see “Replacing the Cover”).
  8. Connect any peripherals and power cords, and power up the system.

## **5 1/4-Inch Accessible Devices**

The chassis is designed so devices within it are easy to install and remove. Note these guidelines before installing or removing a 5 1/4-inch device.

- Special rails are used on 5 1/4-inch devices that allow them to be easily inserted and removed.
- The rails are designed to be stored in an empty bay when they are not attached to a device. The bay cover cannot be secured over an empty bay if the bay has no rails.
- Always place a bay cover over an empty bay.
- NECC recommends that you always keep the rails if you remove a device from the system.
- Use your stored rails on a new device if it doesn’t have the correct type of rail.
- When you convert the chassis to a desktop or a minitower, always move the stored rails for the new position as well.

For procedures on removing or replacing rails, covers, or devices, see the following sections:

- “Removing or Replacing a Bay Cover”
- “Storing and Retrieving Unused Rails”
- “Removing or Installing Device Rails”
- “Removing a 5 1/4-Inch Accessible Device”
- “Installing a 5 1/4-Inch Accessible Device.”

---

## Removing or Replacing a Bay Cover

If the system has an empty 5 1/4-inch device bay, it is covered with a special bay cover. This cover physically protects the inside of the chassis, and its metal shielding also offers EMF protection.

See the following sections for information on removing or replacing a bay cover.

### Removing a Bay Cover

Remove a bay cover as follows.

1. Remove the system cover and front panel, if not already removed (see “System Covers”).
2. Press the tabs on either side of the cover toward each other until they are released from their slots. The tabs are at the end of the rails inside the chassis.
3. Still holding the tabs, slowly slide the cover out along the rails. As soon as the cover is free of the chassis, the cover and the rails disassemble.

#### *Removing a 5 1/4-Inch Device Bay Cover*



4. Use these rails on the new 5 1/4-inch device if its rails are the wrong type (see “Removing or Installing Device Rails”).

If the device already has the right type of rails, set aside the rails you just removed for future use.

---

**Note** Always keep unused rails; the bay cover cannot be replaced if there are no rails within the bay.

---

---

## Replacing a Bay Cover

Replace a bay cover on a bay as follows.

---

**Note** Place unused rails back in the empty bay before attempting to replace a bay cover. The bay cover cannot be secured over the bay if the rails are absent.

---

1. If necessary, put the rails back in the bay. The cover cannot be secured if there are no rails within the bay. (See the next section, “Storing and Retrieving Unused Rails.”)
2. Position the cover so the arrows on either side point up for the chassis orientation you are using.
3. Line up the cover tabs with the slots on the rails. These slots are about 1/4 inch in from the ends of the rails (see the following figure).
4. Place each cover tab in its slot.

### Replacing a Bay Cover



A – Slot on Rail  
B – Tab on Bay Cover

C – Bay Cover

Note: Rails are shown partially out of the system in this figure to show in detail the tabs at the end of each rail; make sure rails are fully inserted *before* attaching a bay cover.

## Storing and Retrieving Unused Rails

The device rails on the 5 1/4-inch devices in the system are designed specially for the chassis. If the system has an unused 5 1/4-inch bay, there should be rails stored within it. Use these rails on new devices (if necessary). If you remove an old device, remove the rails and store them. If there is an empty 5 1/4-inch bay, store the rails in the chassis; otherwise set the rails aside for future use.

To store a rail in an empty bay:

1. Position the end of the rail in the guides within the bay. The underside of the rail should be to the wall of the bay. The tab should be angled away from the center of the bay (see the following figure).

---

## Storing an Unused Rail



**A** – Front of Chassis  
**B** – Device Rail

**C** – Tab at End of Rail

2. Press the rail against the wall of the bay with your thumb and press the tab toward the center of the bay with your forefinger.
3. Still pressing the tab, slide the rail into the bay along the guides until its tab clicks in place.
4. Place a bay cover over the empty bay (see “Replacing a Bay Cover”).

To retrieve a rail from an empty bay:

1. Press the rail against the wall of the bay with your thumb while you press the tab toward the center of the bay with your forefinger.
2. When the tab releases, slide the rail out along the guide.

## Removing or Installing Device Rails

The 5 1/4-inch bays are designed for use with devices that have tabbed rails. These rails allow a device to be easily inserted and removed from the system. If you remove a device from the system, always save the rails, right in the bay if it is empty, to use on a replacement device.

1. Remove a rail by removing the two or three screws that secure it to the side of the device.
2. Secure each rail to the new device with the screws (two or three to a side) from the old device.

### Locating the Screws for 5 1/4-Inch Device Rails



**A** – Screw or Locking Pin

**B** – Device Rail

---

## Removing a 5 1/4-Inch Accessible Device

1. Remove the system unit cover and front panel (see “Removing the Cover” and “Removing the Front Panel”).

---

**! WARNING** Before removing the cover, turn off system power and unplug the system power cable. Power is removed only when the power cable is unplugged.

---

2. Tag and unplug the power and signal cables connected to the device.
3. Press the tabs on either side of the device inward to unlatch the device from the chassis (see the following figure).
4. Slide the device out of the accessible device cage in the chassis.

### *Releasing a 5 1/4-Inch Device*



5. Remove the rails from the old device (see “Removing or Installing Device Rails”).  
If the bay is to remain empty, see step 6 only. If you are installing a new device, skip to step 7.
6. If the bay is to remain empty:
  - Store the rails in the empty bay (see “Storing and Retrieving Unused Rails”).
  - Place the bay cover over the bay (see “Replacing a Bay Cover”).
  - Replace the front panel (see “Replacing the Front Panel”).
  - Replace the cover (see “Replacing the Cover”).
7. If you are installing a new device in the bay:
  - If necessary, place the rails on the new device (see “Removing or Installing Device Rails”).
  - Install the device (see “Installing a 5 1/4-Inch Accessible Device”).



---

## Installing a 5 1/4-Inch Accessible Device

---

**Note** Install rails on the new device before attempting to insert the new device in the system. Use the rails from the old device or the empty bay.

---

1. Remove the system unit cover and front panel (see “Removing the Cover” and “Removing the Front Panel”).
- 

**⚠ WARNING** Before removing the cover, turn off system power and unplug the system power cable. Power is removed only when the power cable is unplugged.

---

2. If you are installing the device in an unused bay, remove the bay cover (see “Removing a Bay Cover”).

If the bay contains a device to be removed, remove the device (see “Removing a 5 1/4-Inch Accessible Device”).

3. If the new device does not already have rails on either side, use the rails from the empty bay or from the old device (see “Removing or Installing Device Rails”).
  4. Position the new device so it is right-side up for the chassis orientation you plan to use (see the following figure).
- 

**⚠ CAUTION** Orient the 5 1/4-inch accessible device correctly for the configuration (desktop or minitower) you plan to use. Make sure the device is right-side up for that configuration.

---

5. Slide the device into the device cage in the chassis. The tab on the end of each rail should click into place when the device is in place.

### *Inserting a 5 1/4-Inch Device for Use in a Minitower*



6. Reconnect the power and signal cables to the device.
7. Replace the front panel (see “Replacing the Front Panel”).
8. Replace the system unit cover (see “Replacing the Cover”).

---

## 3 1/2-Inch Accessible Devices

The 3 1/2-inch accessible devices in the system are housed in a two-device bracket. The bracket installs in the lowest bay of the accessible device cage, much like a 5 1/4-inch accessible device. This applies equally to the desktop or minitower configuration.

The following sections describe how to remove and install 3 1/2-inch accessible devices in the system.

### Removing a 3 1/2-Inch Accessible Device

To remove a 3 1/2-inch accessible device, first remove the bracket holding the device from the system, then remove the 3 1/2-inch accessible device from the bracket.

1. Remove the system unit cover and front panel (see “Removing the Cover” and “Removing the Front Panel”).

---

**⚠ WARNING** Before removing the cover, turn off system power and unplug the system power cable. Power is removed only when the power cable is unplugged.

---

2. Tag and unplug the power and signal cables connected to all devices in the two-device bracket.
3. Press the tabs on either side of the bracket inward to unlatch it from the chassis.
4. Pull the bracket out the front of the chassis.

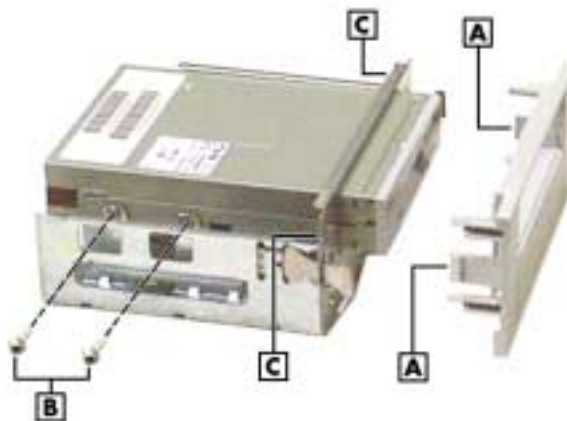
### *Removing the 3 1/2-Inch Accessible Device Bracket*



5. Unlatch the bracket cover by pressing the two side tabs towards each other (see the following figure). Reach in behind the front shield of the bracket for access. Set the cover aside.
6. Remove the four screws (two to a side) that secure the device to the bracket (see the following figure).

---

### The 3 1/2-Inch Accessible Device Bracket



**A** – Side Tabs on Bracket Cover  
**B** – Drive Screws (two of four)

**C** – Best Approach for  
Unlatching Side Tabs

7. Slide the device out the front of the bracket.
8. If you are installing another 3 1/2-inch accessible device, see “Installing a 3 1/2-Inch Accessible Device.” If you are not installing a new device at this time, continue with step 9.
9. Press the plastic bay cover over the opening in the bracket cover.
10. Press the bracket cover over the front shield so the two side tabs click into place.
11. Slide the bracket into the chassis. The tab at either side of the bracket should click into place.
12. If there is still a device in the other bay of the bracket, reconnect its power and signal cables.
13. Replace the front panel (see “Replacing the Front Panel”).
14. Replace the system unit cover (see “Replacing the Cover”).

### ***Installing a 3 1/2-Inch Accessible Device***

Install a new device in the bracket, and then install the bracket in the system.

---

**! WARNING** Before removing the cover, turn off system power and unplug the system power cable. Power is removed only when the power cable is unplugged.

---

1. Follow the procedures in steps 1 to 8 in the previous section, “Removing a 3 1/2-Inch Accessible Device,” to remove the two-device bracket and (if applicable) the old device from the system.
2. If you are installing the device in an empty bay, uncover the bay:
  - remove the 3 1/2-inch plastic bay cover from the bracket cover by pressing its tabs together while pushing it out of its opening
  - remove the breakaway shield (if any) from the front shield by twisting it gently until it comes off.
3. Slide the new device into the front of the bracket, connector end first.

4. Secure the new device to the bracket with four screws, two to a side (see the figure “The 3 1/2-inch accessible device bracket” in the previous section).
5. Press the bracket cover over the front shield so the two side tabs click into place (see the figure “The 3 1/2-inch accessible device bracket” in the previous section).
6. Slide the bracket into the lowest accessible bay in the chassis (for the chassis orientation you plan to use). The tab on the end of each rail should click into place when the bracket is in place.
7. Reconnect the power and signal cables for all devices in the two-device bracket.
8. Replace the front panel (see “Replacing the Front Panel”).
9. Replace the system unit cover (see “Replacing the Cover”).

## 3 1/2-Inch Internal Drives

The internal drives in the system are housed in a removable hard drive bracket. The hard drive bracket is installed in the accessible device cage and is held in place by two screws on the front of the chassis.

The following sections describe how to remove and install 3 1/2-inch internal drives in the system.

### Removing a 3 1/2-Inch Internal Drive

1. Remove the system unit cover and front panel (see “Removing the Cover” and “Removing the Front Panel”).

---

**! WARNING** Before removing the cover, turn off system power and unplug the system power cable. Power is removed only when the power cable is unplugged.

---

2. Locate the internal drive bracket in the system (see the following figure).

*Locating the Internal Drive Bracket*



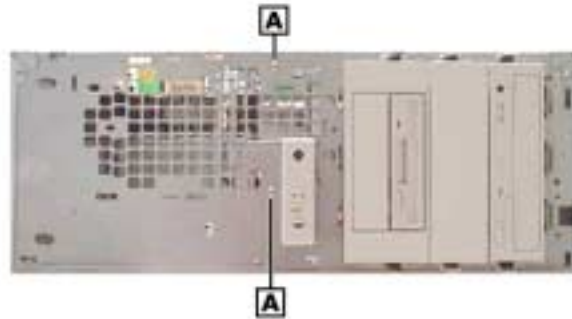
A – Internal Drive Bracket  
B – Front of Chassis

C – Accessible Device Cage

3. Tag and unplug the power and signal cables connected to all devices in the drive bracket.
4. Remove the screws that hold the drive bracket to the front of the chassis (see the following figure).

---

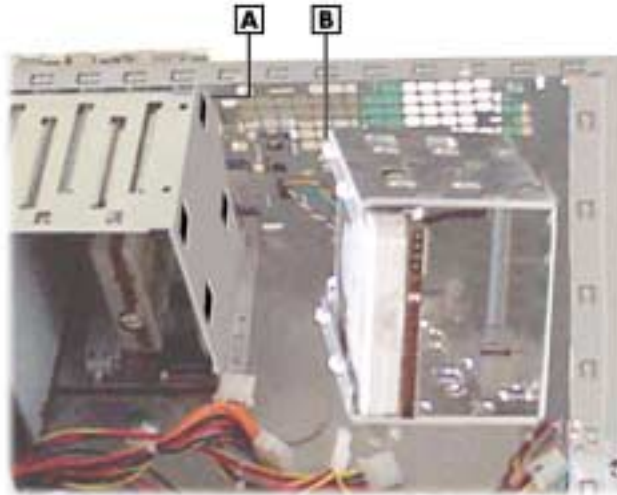
### Locating Internal Drive Bracket Screws



A – Screws

5. Slide the bracket back about one quarter inch. The tabs on the bracket should slide out of the guides on the side of the accessible device cage (see the following figure).

### Sliding the Internal Drive Bracket out of the Chassis



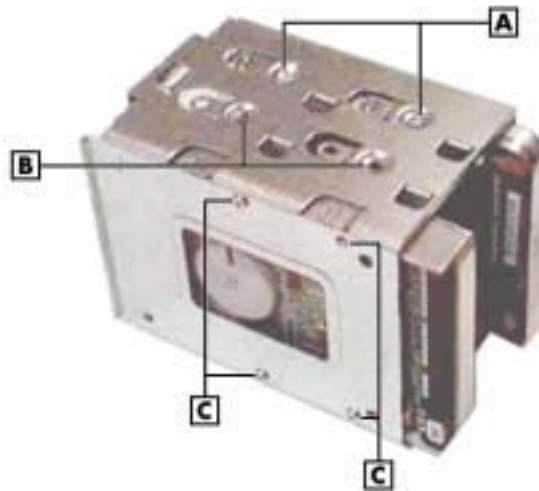
A – Guide

B – Tab (one of four)

6. Remove the four screws that secure the drive to the drive bracket (see the following figure). Depending on the position of the drive, the screws might be located on opposite sides of the bracket, or all on one side of the bracket.

---

### Locating Internal Drive Screws on the Bracket



**A** – Screws (2 of 4)  
**B** – Screw Holes (2 of 4)

**C** – Screws (all on one side)

7. Slide the device out the front of the bracket.
8. If you are installing a new 3 1/2-inch internal drive, see “Installing a 3 1/2-Inch Internal Drive.” If you are not installing a new drive, continue with step 9.
9. Align the tabs on the bracket with the guides on the accessible device cage. Slide the bracket into the chassis.
10. Support the bracket within the chassis while you replace the screws at the front of the chassis.
11. Reconnect the power and signal cables of any drives still in the bracket.
12. Replace the front panel (see “Replacing the Front Panel”).
13. Replace the system unit cover (see “Replacing the Cover”).

### Installing a 3 1/2-Inch Internal Drive

---

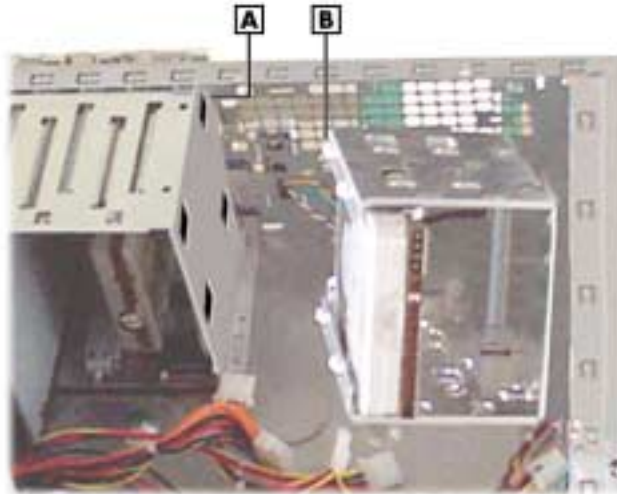
**! WARNING** Before removing the cover, turn off system power and unplug the system power cable. Power is removed only when the power cable is unplugged.

---

1. Follow steps 1 to 8 of “Removing a 3 1/2-Inch Internal Drive” to remove the internal drive bracket and (if applicable) an existing drive from the system.
2. With the drive connectors last, slide the new drive into the bracket.
3. Secure the new device in the bracket with four screws. Depending on the position of the drive, the screws might be located on opposite sides of the bracket, or all on one side of the bracket (see the previous figure).
4. With the drive connectors last, slide the bracket into the chassis. The bracket should slide along the guides on the side of the accessible device cage.

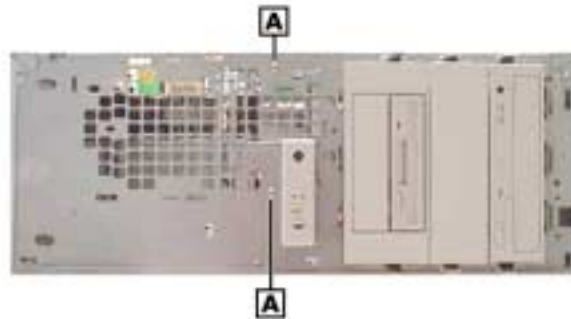
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### *Locating Guides for the Internal Drive Bracket*



5. Support the bracket within the chassis while you replace the screws at the front of the chassis.

### *Securing the Internal Drive Bracket*



A – Screws

6. Reconnect the power and signal cables for all devices in the drive bracket.
7. Replace the front panel (see “Replacing the Front Panel”).
8. Replace the system unit cover (see “Replacing the Cover”).

---

## CMOS Battery

The system board uses a CMOS battery to maintain system configuration information. The battery is a coin-cell battery mounted on the system board (see the following figure). If it fails to maintain system configuration information, replace it with an identically rated battery from the same manufacturer.

---

**! WARNING** The battery can explode if it is incorrectly replaced or improperly discarded. Use only the same type battery or an equivalent type recommended by the manufacturer when replacing the battery.

Lithium acts as a catalyst when exposed to water and causes spontaneous combustion on contact. Discard used batteries according to the manufacturer's instructions.

---

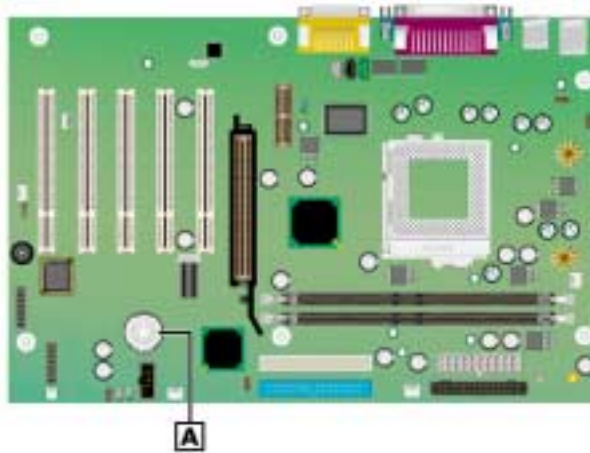
**! CAUTION** Removing the battery from the system board causes the system to lose system configuration information. Prior to removing the battery, run the BIOS Setup Utility (see Section 2) and print out or write down your system configuration settings. Then you can restore the system to its previous settings.

---

If you need to replace the battery, follow these steps.

1. Turn off and unplug the system and any external components connected to it.
2. Remove the system cover (see "Removing the Cover" in Section 3). Observe all safety precautions when removing the cover.
3. Locate the battery on the system board (see the following figure).

### *Locating the Battery on the System Board*



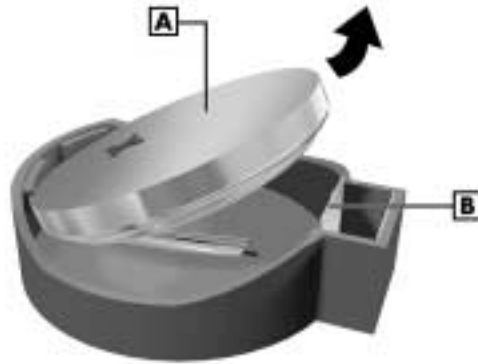
A – Battery

4. Press down on the battery clip to release the battery from its socket on the system board.
5. Remove the battery and discard in accordance with the manufacturer's instructions.



---

### Removing the Battery



A – Battery

B – Clip

6. With the positive (+) side of the new battery facing up, press the battery into the socket.
7. Replace the system cover (see “Replacing the Cover”).
8. Connect external peripherals and power cables, and power up the system.
9. Run the Setup Utility to reconfigure your system parameters (see “BIOS Setup Utility” in Section 2).

## System Board

Remove the system board only if you cannot easily upgrade components on the system board while it is within the chassis, or if you are replacing the system board.

### Removing the System Board

1. Remove the cover (see “Removing the Cover” earlier in this chapter).

---

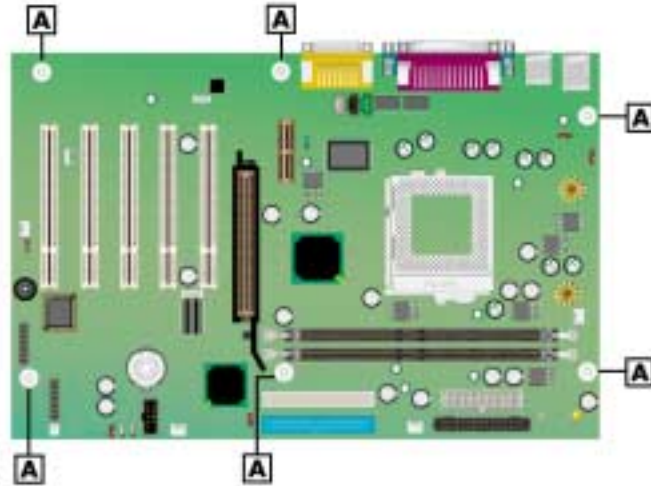
**! WARNING** Before removing the cover, turn off system power and unplug the system power cable. Power is removed only when the power cable is unplugged.

---

2. Remove all installed expansion boards (see “Removing an Expansion Board”).
3. Tag and disconnect all cables connected to the system board.
4. Remove the six screws securing the system board in the chassis (see the following figure).

---

### Locating System Board Screws



A – System Board Screws

5. Ensuring you do not touch any components, carefully lift the system board out of the chassis.
6. If you are discarding the board, first remove useable memory modules, the processor, or cables, as appropriate.
7. Set the system board aside on a stable static-free surface.

### Reinstalling the System Board

---

**⚠ CAUTION** NECC recommends that you contact your NECC Technical Support Center for assistance in removing or replacing your system board.

---

1. Place the system board in the chassis.  
The screw holes in the board should align with the holes in the chassis. The back panel connectors should fit perfectly into the back of the chassis.
2. Secure the board to the chassis with the six screws previously removed.
3. Reconnect any cables that were disconnected from the system board.
4. Replace the expansion boards (see “Installing an Expansion Board”).
5. If appropriate, install any memory modules, processor, or cables from a previous board.
6. Replace the system unit cover (see “Replacing the Cover”).

---

## Power Supply

Remove the power supply as follows.

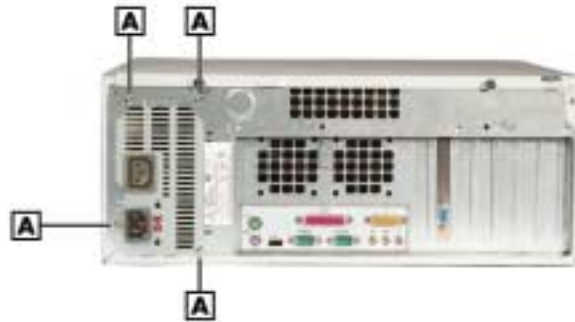
---

**! WARNING** Before removing the system cover, turn off the power and unplug the system power cable. Power is removed only when the power cable is unplugged.

---

1. Turn off the system and any connected peripherals.
2. Unplug the system AC power cord and any peripheral power cords.
3. Disconnect any attached peripherals.
4. Remove the system cover (see “Removing the Cover” earlier in this section).
5. Tag and unplug the power cables from all installed devices.
6. Remove the four screws holding the power supply to the rear of the chassis.

### *Locating the Power Supply Screws*



A – Screws (4)

7. Slide the power supply towards the front of the chassis enough to clear the chassis.
8. Lift the power supply out of the chassis and set aside.

---

## Front USB Port

Remove the front USB port using these steps.

1. Remove the system unit cover and front panel (see “Removing the Cover” and “Removing the Front Panel”).
2. Disconnect the front USB port cable from its header on the system board.
3. Remove the two screws that secure the USB port to the front of the chassis. Save the screws.

### Locating Front USB Port Screws



A – Screw

B – USB Port Board

4. Gently pull the board off the chassis and feed its cable through the cutout in the front of the chassis.

Reverse this procedure to install a front USB port.

## Front LED/Switch Bracket

Remove the LED/switch bracket from the front of the chassis using these steps.

---

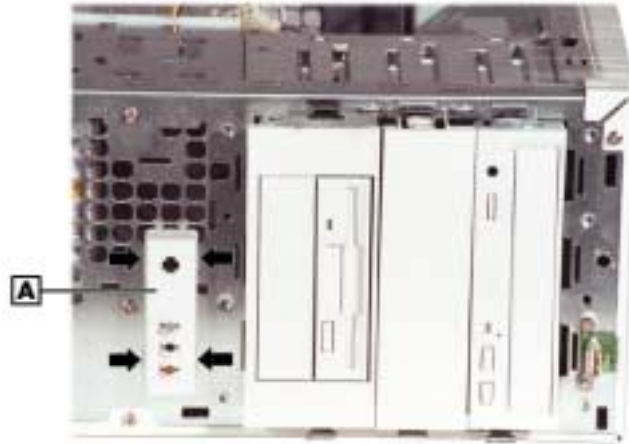
**! WARNING** Before removing the system cover, turn off the power and unplug the system power cable. Power is removed only when the power cable is unplugged.

---

1. Remove the cover and front panel (see “Removing the Cover” and “Removing the Front Panel”).
2. Disconnect the LED/switch cable connector from its header on the system board.
3. Press both sides of the LED/switch bracket together to disengage the tabs that hold it to the chassis. (The tabs are hooked on the left side, so only the tabs on the right side disengage.)

---

### *Releasing the Front LED/Switch Bracket*



**A** – Front LED/Switch Bracket

4. Open the LED/switch bracket toward the left. Once the right tabs are free, the hooked left tabs can be freed.

### *Removing the Front LED/Switch Bracket*



5. Gently feed the LED/switch cable assembly through the cutout in the front of the chassis.  
To replace the LED/switch bracket, reverse these steps.

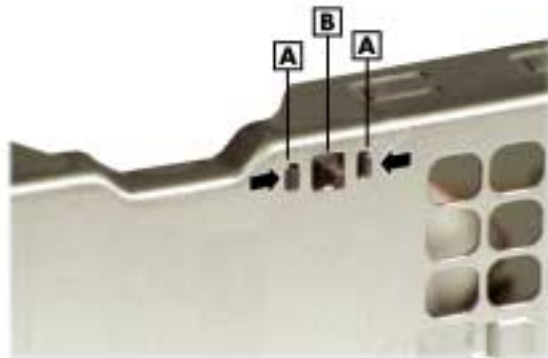
---

## Chassis Intrusion Switch

If installed, remove the chassis intrusion switch from the rear edge of the chassis using these steps.

1. Remove the cover (see “Removing the Cover”).
2. Disconnect the chassis intrusion switch cable from its header on the system board.
3. Press together the tabs that hold the chassis intrusion switch to the chassis (see the following figure).

*Removing the Chassis Intrusion Switch*



A – Tab

B – Chassis Intrusion Switch

C – Back of Chassis

4. Once the tabs are free, gently push the chassis intrusion switch through its cutout in the chassis wall.

To replace the chassis intrusion switch, reverse these steps.

---

## ***Minitower and Desktop Setup***


The system ships as a minitower and can be reconfigured as a desktop or, if a desktop, it can be reconfigured back to a minitower. The accessible devices in the system can be positioned so they are upright for the minitower orientation or for the desktop orientation.

The following sections describe how to convert between minitower and desktop orientations.

### ***Converting from Minitower to Desktop***

The system comes factory-shipped as a minitower computer. Convert the system for use as a desktop computer using the following steps.

---

 **WARNING** Before converting the system, turn off system power and unplug the system power cable. Power is removed only when the power cable is unplugged.

---

1. Turn off and unplug the system.
2. Disconnect any external options (such as a keyboard and monitor) from the front or rear of the system unit.
3. Place the system unit on its right side. The lamps on the control panel should be below the power button. The drives are now on their sides in the drive cage.
4. Remove the system cover (see “Removing the Cover”).
5. Remove the front panel (see “Removing the Front Panel”).
6. Remove all devices, covers, and stored rails from the accessible device cage. See the following sections for the procedures.
  - “Removing a Bay Cover”
  - “Storing and Retrieving Unused Rails”
  - “Removing a 5 1/4-Inch Accessible Device”
  - “Removing a 3 1/2-Inch Accessible Device”
7. Replace all devices, covers, and rails in the accessible device cage so they are right-side up in the drive cage. Place them in the same order they were in before. See the following sections for the procedures.
  - “Storing and Retrieving Unused Rails”
  - “Replacing a Bay Cover”
  - “Installing a 5 1/4-Inch Accessible Device”
  - “Installing a 3 1/2-Inch Accessible Device”

---

## Accessible Device Placement for a Desktop



**A** – 5 1/4-Inch Bays on Top

**B** – 3 1/2-Inch Bracket in Lowest Bay

8. Remove the logo plate by unclipping its tabs from inside the front panel. Position the logo plate so it is readable when the chassis is in the horizontal position. Press the tabs into the front panel until they click in place.
9. Replace the front panel (see “Replacing the Front Panel”).
10. Replace the system cover (see “Replacing the Cover”).

### ***Converting from Desktop to Minitower***

If the system has been used as a desktop, you can convert it to a minitower system using the following steps.

---

**! WARNING** Before converting the system, turn off system power and unplug the system power cable. Power is removed only when the power cable is unplugged.

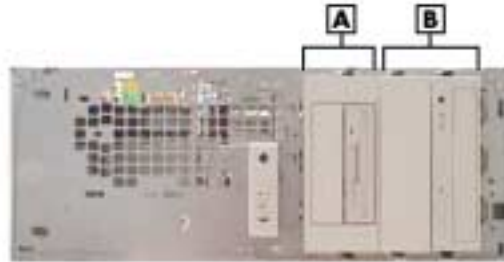
---

1. Turn off and unplug the system.
2. Disconnect any external options (such as a keyboard and monitor) from the front or rear of the system.
3. Remove the system cover (see “Removing the Cover”).
4. Remove the front panel (see “Removing the Front Panel”).
5. Remove all devices, covers, and stored rails from the accessible device cage. See the following sections for the procedures.
  - “Removing a Bay Cover”
  - “Storing and Retrieving Unused Rails”
  - “Removing a 5 1/4-Inch Accessible Device”
  - “Removing a 3 1/2-Inch Accessible Device”



- 
6. Replace all devices, covers, and rails in the accessible device cage so they sit sideways in the drive cage, with their top surfaces toward the right end of the chassis (see the following figure). Place them in the same order they were in before. See the following sections for the procedures.
    - “Storing and Retrieving Unused Rails”
    - “Replacing a Bay Cover”
    - “Installing a 5 1/4-Inch Accessible Device”
    - “Installing a 3 1/2-Inch Accessible Device”

*Accessible Device Placement for a Minitower*



**A** – 3 1/2-Inch Bracket

**B** – 5 1/4-Inch Bays

7. Remove the logo plate by unclipping its tabs from inside the front panel. Position the logo plate so it is readable when the chassis is in the vertical position. Press the tabs into the front panel until they click in place.
8. Replace the front panel (see “Replacing the Front Panel”).
9. Replace the system cover (see “Replacing the Cover”).
10. Place the system unit in a vertical position. The power button and the lamps on the control panel should run from left to right. The drives should be right-side up in the drive cage.
11. Reconnect any external options (such as a keyboard and monitor) to the front or rear of the system unit.
12. Reconnect the power cable to the system and to a properly grounded wall unit or surge protector.

---

## **Chassis Shell**

---

**Note** The chassis shell (the U-shaped covering with rubber feet on two sides) should only be removed by authorized service personnel. No replaceable parts are accessed from this panel, and it should only be removed if it is being replaced due to damage.

---

The chassis shell is secured to the chassis with two screws on the rear face of the chassis, and three screws on the front face of the chassis. Remove all five screws. Carefully slip the shell, which is slightly flexible, off the corners of the chassis. Lift the chassis out of the shell.

### **Replacing the Chassis Shell**

The chassis shell is secured to the chassis with two screws on the rear face of the chassis and three screws on the front face of the chassis. To replace the chassis shell, orient it so its screw holes align with the screw holes on the front and rear faces of the chassis. Place the chassis in the chassis shell, and fit the corner edges of the shell over the chassis. Secure the shell to the chassis with the five screws.

# 4

## System Board

- External Cable Connectors
  - Internal Cable Connectors
  - Jumper Settings
  - Upgrade Sockets
  - Components
  - Resources
-

---

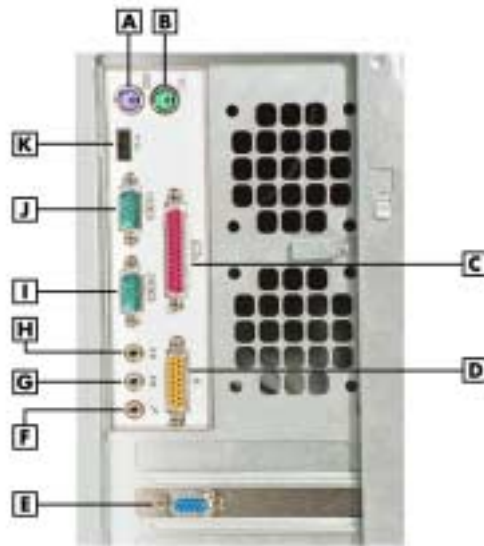
This section describes the locations of connectors, jumpers, and sockets on the system board, including any external cable connectors, internal board connectors and slots, jumper locations, and upgrade sockets.

Included in this section are procedures for setting jumpers on the system board and a RIMM memory upgrade path for the RIMM sockets. Also included are descriptions of system board components, system memory map, I/O addresses, and DMA settings.

## **External Cable Connectors**

Locations of the external cable connectors on the system board at the back of the minitower and desktop systems are shown in the following figures. For descriptions of the connectors, see Section 1, “System Overview.”

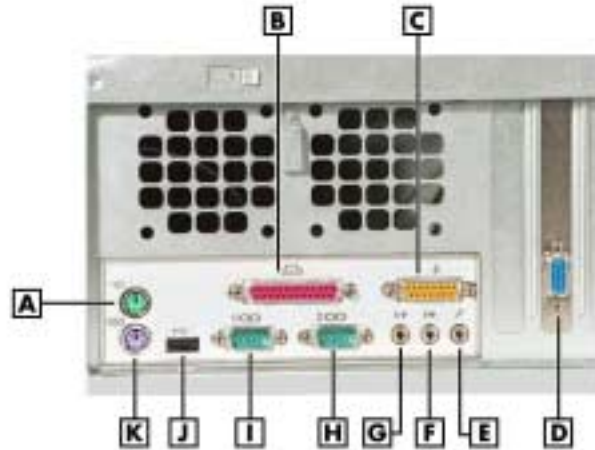
*Minitower External Cable Connector Locations*



- |   |                          |
|---|--------------------------|
| <b>A</b> – Keyboard Connector             | <b>G</b> – Line In       |
| <b>B</b> – Mouse Connector                | <b>H</b> – Line Out      |
| <b>C</b> – Parallel Port                  | <b>I</b> – Serial Port 2 |
| <b>D</b> – MIDI/Game Port                 | <b>J</b> – Serial Port 1 |
| <b>E</b> – VGA Connector (on video board) | <b>K</b> – USB Port      |
| <b>F</b> – Microphone In                  |                          |

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### Desktop External Cable Connector Locations

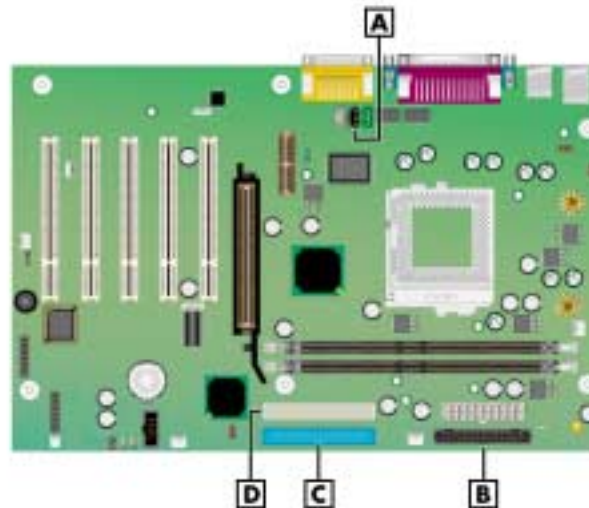


- |   |                          |
|---|--------------------------|
| <b>A</b> – Mouse Connector                | <b>G</b> – Line Out      |
| <b>B</b> – Parallel Port                  | <b>H</b> – Serial Port 2 |
| <b>C</b> – MIDI/Game Port                 | <b>I</b> – Serial Port 1 |
| <b>D</b> – VGA Connector (on video board) | <b>J</b> – USB Port      |
| <b>E</b> – Microphone In                  | <b>K</b> – Keyboard Port |
| <b>F</b> – Line In                        |                          |

### Internal Cable Connectors

Locations of the internal cable connectors on the system board are shown in the following figure.

#### System Board Internal Cable Connectors



- |   |                                    |
|---|------------------------------------|
| <b>A</b> – CD Audio In                    | <b>C</b> – IDE Primary Connector   |
| <b>B</b> – Diskette Drive Cable Connector | <b>D</b> – IDE Secondary Connector |

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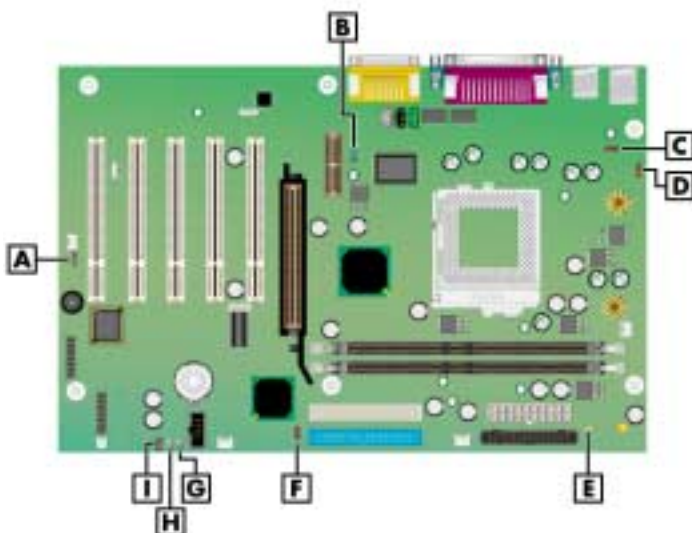
## Jumper Settings

The following sections provide the names and locations of jumpers on the system board, and provides instructions on changing a jumper setting.

### Locating System Board Jumpers

The following figure shows the locations of the jumpers on the system board.

System Board Jumper Locations



- |  |  |
|--|--|
| <b>A</b> – CMOS Clear (JP4)                | <b>F</b> – BIOS Recovery (JP5)             |
| <b>B</b> – Audio Modem Riser Select (JP11) | <b>G</b> – USB Selection (JP28)            |
| <b>C</b> – Rear USB Wakeup (JP3)           | <b>H</b> – USB Selection (JP27)            |
| <b>D</b> – PS/2 Keyboard Power On (JP16)   | <b>I</b> – Front USB Device Wake Up (JP21) |
| <b>E</b> – Save to RAM (JP18)              |  |

The system board factory-set jumper settings are included in Section 2, “System Configuration.” How to change a jumper setting is described in the next section.

### Changing a Jumper Setting

Change a jumper setting on the system board as follows.

---

**CAUTION** Jumpers are set correctly at the factory for the system configuration. Only change the appropriate jumper setting for your application.

---

1. Power off and unplug the system and any peripherals.

---

**WARNING** The system power must be off before removing the cover and changing a jumper setting.

---

2. Remove the system cover (see “System Covers” in Section 3).

- 
3. Locate the jumper on the system board (see the preceding figure, “System Board Jumper Locations”).
  4. Remove any subassemblies blocking access to the jumper (see Section 3, “Disassembly and Reassembly,” for procedures).
  5. Change the jumper setting by moving the jumper to or from the pins as indicated in the jumper settings tables (see “System Board Jumper Settings” in Section 2).
- 

**⚠ CAUTION** For some functions, a jumper is moved or removed for only a few seconds. The jumper change takes effect immediately, even if the jumper is moved back to its original setting. Check the jumper settings tables carefully and be sure to move the correct jumper so you don't inadvertently change important settings.

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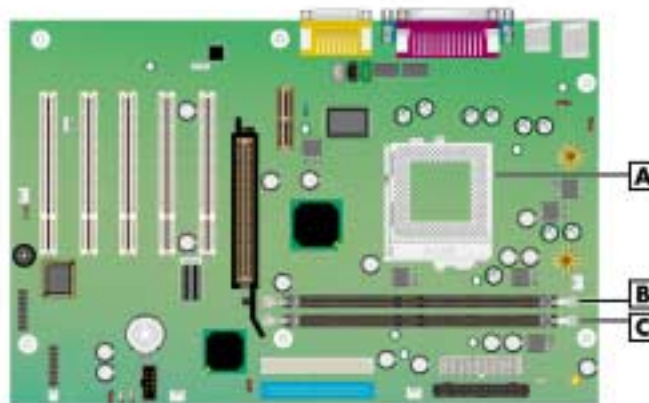
6. Replace any removed disassemblies and the system cover (see Section 3).
7. Connect any peripherals and power cords and power on the system.

## Upgrade Sockets

The system board has the following upgrade sockets:

- processor socket
- RIMM sockets.

*System Board Upgrade Sockets*



A – Processor Socket  
B – RIMM 1 Socket

C – RIMM 2 Socket

---

## Processor Socket

The processor installs in a 370-pin Socket 370 on the system board. The processor is held in place in the socket by a locking lever attached to the socket and a removable retention clip. The retention clip anchors both the processor and the processor heat sink to the Socket 370.

To remove or install a processor, see Section 3, “Disassembly and Reassembly.”


## RIMM Sockets

Memory upgrades are installed into two memory module sockets on the system board. The sockets support up to 512 MB of high-speed memory. The system supports 184-pin, 800-MHz RDRAM modules in 64-, 128-, and 256-MB unbuffered memory configurations.

Use the following guidelines for selecting and installing RIMM modules:

- RIMM modules can be installed in one or two sockets
- if installing a RIMM module in only one socket, a continuity module must be installed in the second socket

---

 **CAUTION** Ensure that both RIMM sockets are filled with two RIMM modules or one RIMM module and one continuity module. If both sockets are not filled, system memory won't work well or at all.

---

- the size of the RIMMs can vary between sockets but the memory operates at the speed of the slowest module
- for sample memory configurations, see the following table, “Sample RIMM Upgrade Paths”
- to determine the memory you need for a memory upgrade, see “Checking System Memory” later in this section
- to locate memory module sockets on the system board, see the previous figure, “System Board Upgrade Sockets.”
- to remove or install a RIMM module, see Section 3, “Disassembly and Reassembly.”

### Sample RIMM Upgrade Paths

Total Memory	RIMM 1	RIMM 2
64 MB	64 MB	Continuity Module
128 MB	64 MB	64 MB
128 MB	128 MB	Continuity Module
256 MB	128 MB	128 MB
256 MB	256 MB	Continuity Module
512 MB	256 MB	256 MB

The information in this table shows sample RIMM upgrade paths. It does not represent every combination of RIMMs supported in the system.



---

## Checking System Memory

If you do not know how much memory is installed in the system, check the amount by using the following procedure.

1. On the Windows desktop, point to **My Computer**, and click the right mouse button.
2. With the left mouse button, click **Properties**. Click the **General** tab to display the random access memory (RAM). This is the amount of system memory in the computer.

In Windows 98 or Windows 2000, you can also find the amount of memory by pointing to **My Computer**, clicking the right mouse button, clicking **Properties**, and clicking the **Performance** tab.

## Components

The system board has the following components:

- Intel 820 chip set used for AGP, PCI, memory, and peripheral control. The chip set incorporates
  - 82820 Memory Controller Hub (MCH)
  - 82801 I/O Controller Hub (ICH)
  - 82802 Firmware Hub (FWH)
  - integrated audio/modem-Codec 97 controller
  - AGP 2.0 support
  - RDRAM support
  - LAN support
  - system manageability bus
  - 100-MHz and higher system bus capability
- Winbond Super I/O controller
- PhoenixBIOS™ in a flash memory device supporting system setup and PCI auto-configuration
- 32-KB L1 cache integrated on the Pentium III processor
- 256-KB L2 cache integrated on the Pentium III processor
- 64 MB to 512 MB of RDRAM upgradeable with 64-MB, 128-MB, or 256-MB RIMM modules installed in two RIMM sockets on the system board
- system Setup Utility built into the BIOS
- 4-Mb FLASH ROM for fast economical BIOS upgrades
- integrated sound
- power management with power saving mode
- external connectors for connecting the following external devices:
  - personal system/2 (PS/2(r))-style mouse
  - PS/2-style keyboard
  - bi-directional Enhanced Parallel Port (EPP) and Enhanced Capabilities Port (ECP) support for a parallel printer

- serial devices through two buffered 16C550 UART serial ports, supporting up to 115.2 KB per second
- two USB devices
- joystick through the MIDI/game port
- speaker and microphone connectors (line in, line out, microphone in).

The following table lists the major components on the system board.

### ***System Board Components***

<b>Component</b>	<b>Function</b>
Pentium III Processor	667-MHz or higher processor , 133-MHz or higher FSB
Intel 820 Chipset:	
82820 Memory Controller Hub (MCH)	<p>Uses Intel graphics technology, software drivers, and Direct AGP (integrated AGP) to create vivid 2D and 3D effects and images. Features integrated Hardware Motion Compensation to improve video quality.</p> <p>Features processor and host bus optimized for the processor, integrated RDRAM controller, 3D graphics visual enhancements, 3D graphics texturing enhancements, digital video output, integrated 24-bit 230 MHz RAMDAC, 2D graphics, arithmetic stretch blitter video, integrated graphics memory controller, display cache interface, arbitration scheme and concurrency, data buffering, power management functions, and support for I/O bridge.</p>
82801AA I/O Controller Hub (ICH)	<p>Uses Accelerated Hub Architecture to make direct connection from graphics and memory to the integrated AC97 controller, IDE controller, and dual USB ports.</p> <p>Supports PCI bus interface, integrated IDE controller, USB, AC'97 Link for audio and telephone Codecs, interrupt controller, timers, 3.3V operation, power management logic, enhanced DMA controller, real-time clock, SM bus, and Firmware Hub.</p>
82802 Firmware Hub (FWH)	<p>Stores system BIOS and video BIOS, eliminating a redundant nonvolatile memory component. In addition, the 82802 contains a hardware Random Number Generator (RNG). The Intel RNG provides truly random numbers to enable fundamental security building blocks supporting stronger encryption, digital signing, and security protocols.</p> <p>Features Intel Platform Compatibility, Firmware Hub Hardware Interface Mode, configurable interfaces, flash memory for non-volatile storage, and address/address multiplexed interface mode.</p>

---

## **System Board Components**

<b>Component</b>	<b>Function</b>
Winbond Super I/O W83627HF-AW controller	The controller supports the following: Industry-standard floppy controller Multimode parallel port Centronics compatible (standard mode) Enhanced capabilities port (ECP) Enhanced parallel port (EPP) Two RS-232C serial ports Two USB ports Integrated PS/2 keyboard and mouse controller One MIDI/Game port Hardware monitor
Yamaha Sound YMF 752-S	Audio integrated on system board, compatible with Windows Sound System

---

### **Processor and Secondary Cache**

The system uses a Pentium III processor with an internal clock speed of 533 MHz or higher (depending on type of processor).

The processors are advanced pipelined 32-bit addressing, 64-bit data processors designed to optimize multitasking operating systems. The 64-bit registers and data paths support 64-bit addresses and data types.

To use the processor's power, the system features an optimized 64-bit memory interface and 256 KB of secondary write-back cache on the processor.

The processor is compatible with 8-, 16-, 32-, and 64-bit software written for the Intel386™, Intel486™, Pentium, Pentium II, and Pentium III processors. The processor is installed in a Socket 370 on the system board.

### **System BIOS**

The PCI-compatible BIOS is contained in a 4-Mb flash memory device on the system board. The BIOS provides Power-On Self-Test (POST), system Setup program, PCI auto-configuration utility, and BIOS recovery code.

The FLASH ROM allows fast, economical BIOS upgrades. The FLASH ROM is a reprogrammable EPROM containing both the system and video BIOS. Using the FLASH ROM to change the ROM BIOS provides the following advantages:

- BIOS upgrade is performed quickly and easily
- expense of replacing ROM BIOS chips is eliminated, so system maintenance costs are reduced
- less chance of inadvertently damaging the system board than when physically replacing ROMs
- network administrators can exercise company-wide control of BIOS revisions.

The BIOS programs execute the Power-On Self-Test (POST), initialize processor controllers, and interact with the display, diskette drive, hard drives, communication devices, and peripherals. The system BIOS also contains the Setup Utility.

---

The FLASH ROM allows the system and video BIOS to be upgraded with the BIOS Update Utility, without having to physically remove the ROM (see Section 2 for further information on the BIOS Update Utility). The FLASH ROM supports the reprogramming of the system BIOS and the video BIOS.

## **System Memory**

The system comes with between 64 MB and 512 MB of RDRAM installed in two RIMM sockets on the system board.

The RIMM sockets accept 184-pin, 64-, 128-, and 256-MB RIMMs. See the “Sample RIMM Memory Upgrade Paths” earlier in this section for a list of supported RIMMs.

## **Plug and Play**

The system comes with a plug and play BIOS in support of plug and play technology. Plug and play simplifies setup procedures for installing plug and play expansion boards. With plug and play, adding a plug and play expansion board is done by turning off the system, installing the board, and turning on the system. There are no jumpers to set and no system resource conflicts to resolve. Plug and play automatically configures the board. (Some plug and play devices might need to be jumpered if used in a system running the Windows NT operating system.)

## **PCI/IDE Ports**

The system board has two high-performance PCI/IDE ports: a primary port and a secondary port. The primary PCI/IDE port has an enhanced IDE interface that supports PIO Mode 4 devices with 66 MB per second maximum burst rate data transfers on the high-performance Ultra DMA bus. The primary port supports Ultra DMA/66.

The installed hard drive is connected as a master device on the primary PCI/IDE port. The installed CD-ROM drive or DVD-ROM drive is connected to the secondary PCI/IDE port as a master device. The hard drive is connected to the primary port with a three-connector Ultra DMA/66 40-pin, 80-conductor cable. The CD-ROM or DVD-ROM is connected to the secondary port with a standard three-connector IDE cable.

## **Parallel Interface**

The system has a 25-pin bidirectional parallel port on the system board. Port specifications conform to the IBM-PC standards. The port supports Enhanced Capabilities Port (ECP) and Enhanced Parallel Port (EPP) modes for devices that require ECP or EPP protocols. The protocols allow high-speed bi-directional transfer over a parallel port and increase parallel port functionality by supporting more devices.

The BIOS has automatic ISA printer port sensing that works with most devices. If the BIOS detects an ISA printer port mapped to the same address, the built-in printer port is disabled. (Verify in the BIOS Setup that printer ports mapped to the same address are enabled or disabled appropriately.) The BIOS also sets the first parallel interface port it finds as LPT1 and the second port it finds as LPT2. The interrupt is set at IRQ7 via the BIOS Setup Utility. Software-selectable base addresses are 378h, 278h, and 3BCh.

Sets of I/O addresses for the parallel port are given in the following table (see Section 2, “System Configuration,” for interrupt levels). This is a list of all possible configurations; the parallel port uses only one set.

---

### ***Parallel Port Addresses***

<b>Starting I/O Address</b>	<b>Port</b>
378	LPT1
278	LPT1
3BC	LPT1
378	LPT2
278	LPT2
3BC	LPT2

Parallel interface signals are output through the system board's 25-pin, D-subconnector. The connector is located at the back of the system unit.

### ***Serial Interface***

The system has two 16C550 UART compatible serial ports (COM1 and COM2) integrated on the I/O controller. The serial ports support the standard RS-232C interface. The buffered high-speed serial ports support transfer rates up to 115.2 KB. The ports allow the installation of high-speed serial devices for faster data transfer rates.

Sets of I/O addresses for the channels are given in the following table (see Section 2, "System Configuration," for interrupt levels). Soft-selectable base addresses are 3F8h, 2F8h, 3E8h, and 2E8h.

### ***Serial Port 1 and Serial Port 2 I/O Addresses***

<b>Starting I/O Address</b>	<b>Port</b>
3F8	COM1
2F8	COM2
3E8	COM3
2E8	COM4
3F8	COM1
2F8	COM2
3E8	COM3
2E8	COM4

See Section 2, "System Configuration," for information on resetting the port through the BIOS Setup Utility. See Section 9, "Specifications," for the serial interface specifications.

Serial interface signals are output through the system board's 9-pin, D-subconnector. The connector is located at the back of the system unit.

---

## ***USB Interface***

The Universal Serial Bus (USB) ports allow plug and play serial devices to be added without having to open the system. One USB device can be plugged into each USB port for direct system connection. With a hub and the proper cabling, up to 127 USB devices per port can be addressed by the system.

The USB determines system resources for each peripheral and assigns them without user intervention. Boot support for a USB keyboard is present so the system can be booted with a USB keyboard instead of a standard keyboard.

## ***Accelerated Graphics Port***

The system board contains an AGP connector for the system's AGP video board. The AGP board has a graphics controller, video memory, and a VGA-compatible connector. The AGP port supports graphics-intensive, 2D/3D applications.

The 4X AGP graphics controller on the video board is specifically designed for graphics-intensive operations, including 3D and 2D effects, texture mapping, text and color pixel amplification, and video acceleration. The controller minimizes bus traffic by off-loading the tasks normally performed by the processor, providing 64-bit, high resolution performance for demanding True Color displays and other sophisticated graphics functions.

Connect a monitor to the AGP video board's VGA connector on the back of the system.

## ***Integrated Audio***

To support multimedia applications, an Yamaha YMF 752-S audio chip is integrated on the system board. The chip provides 16-bit stereo, Sound Blaster Pro-compatible audio.

The sound system provides all the digital and analog mixing functions required for playing and recording audio on personal computers. Features include stereo analog-to-digital and digital-to-analog converters, analog mixing, anti-aliasing and reconstruction filters, line and microphone level inputs, digital audio compression, and full digital control of all mixer and volume control functions.

---

## Resources

The system memory map, I/O addresses, and DMA settings are given in the following sections. System interrupt settings, parallel interrupt settings, and serial interrupt settings are included in Section 2, "System Configuration."

### Memory Map

The system memory map is shown in the following table.

**System Memory Map**

Memory Space	Function
000A0000 - 000AFFFF	Winfast 3D S320 II (TNT2-PRO)
000B0000 - 000BFFFF	Winfast 3D S320 II (TNT2-PRO)
000C8000 - 000D7FFF	Winfast 3D S320 II (TNT2-PRO)
08000000 - 09FFFFFF	Intel® 82820 Processor to AGP Controller
08000000 - 09FFFFFF	Winfast 3D S320 II (TNT2-PRO)
0A000000 - 0AFFFFFF	Winfast 3D S320 II (TNT2-PRO)
0A000000 - 0B0FFFFF	Intel® 82820 Processor to AGP Controller
0B000000 - 0B00FFFF	Winfast 3D S320 II (TNT2-PRO)
F8000000 - FBFFFFFF	Intel® 82820 Processor to I/O Controller
FF800000 - FFFFFFFF	Motherboard Resources

### I/O Addresses

The processor communicates with I/O mapping. The hexadecimal (hex) addresses of I/O devices are listed in the following table.

**Note** In plug and play systems, these addresses are typical but may vary by configuration.

**I/O Address Map**

Address (Hex)	I/O Device Name
0000-000F	DMA controller 1
0020-0021	Programmable interrupt controller
0040-0043	System Timer
0060	Standard 101/102-key or MS Natural keyboard
0061	System speaker
0064	Standard 101/102-key or MS Natural keyboard
0070-0071	System CMOS/real time clock
0081-008F	DMA controller
00A0-00A1	Programmable interrupt controller

---

### ***I/O Address Map***

<b>Address (Hex)</b>	<b>I/O Device Name</b>
00C0-00DF	DMA controller
00F0-00FE	Numeric data processor
0170-0177	Secondary IDE channel/Intel 82801AA Bus Master IDE controller
01F0-01F7	Primary IDE channel/Intel 82801AA Bus Master IDE controller
0200-0207	Gameport/Joystick
02F8-02FF	Communications Port (COM2)
0300-0301	MPU-401 Compatible
0376	Secondary IDE channel/Bus Master IDE controller
0378-037F	ECP printer port (LPT 1)
03B0-03BB	Winfast 3D 5320 II (TNT-PRO)
03C0-03DF	Winfast 3D 5320 II (TNT-PRO)
03F0-03F3	Standard floppy disk controller
03F4-03F5	Standard floppy disk controller
03F6	Intel 82801AA Bus Master IDE controller/primary IDE controller
03F7	Standard floppy disk controller
03F8-03FF	Communications port (COM1)
0778-077F	ECP printer port (LPT 1)
0CF8-0CFF	PCI bus
1200-12FF	Yamaha AC XG audio device
1300-133F	Yamaha AC XG audio device
1800-1807	Primary IDE controller
1800-180F	Intel 82801AA Bus Master IDE controller/secondary IDE controller
1810-181F	Intel 82801AA SMBus controller
1820-183F	Intel 82801AA USB Universal Host Controller

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## **DMA Settings**

The system's DMA settings are given in the following table.

### ***DMA Settings***

<b>DMA Setting</b>	<b>Device</b>
0	Available
1	Available
2	Standard Floppy Disk Controller
3	ECP Printer Port (LPT 1)
4	Direct memory access controller
5	Available
6	Available
7	Available

---

# 5

## Illustrated Parts Breakdown

- Ordering Parts
- Field Replaceable Units
- Illustrated Parts Breakdown

---

This section contains the illustrated parts breakdown (IPB) and NECC part descriptions for the PowerMate CT system.

The following tables list

- telephone numbers for ordering system parts and options
- field-replaceable parts for the system.

The PowerMate CT system illustrated parts breakdown figure is at the end of this section.

## Ordering Parts

Use the telephone number in the following table to order spare parts.

### Ordering Parts

Items	Telephone Number
To order spare parts:	1-800-632-4525

## Field Replaceable Units

The following table lists the field replaceable units (FRUs) for the PowerMate CT system.

### PowerMate CT System FRUs

Item	Description
1	Power Cable
2	Keyboard
3	CD-ROM Audio Cable
4	Logitech 3-Button Mouse
5	Ultra DMA/66 Cable, 3-connector
6	IDE Cable, 3-connector
7	Diskette Drive Signal Cable, 2-connector
8	Coin-cell Battery
9	Heat Sink for Pentium III Processor
10*	Pentium III Processor CPU Assembly: 667-MHz or higher, FSB 133-MHz or higher, 256 K Cache
11*	64-MB RDRAM RIMM Module 128-MB RDRAM RIMM Module 256-MB RDRAM RIMM Module
12	Continuity Module
13	System Board (GA-6CX7)

---

### **PowerMate CT System FRUs**

---

<b>Item</b>	<b>Description</b>
14	I/O Shield
15*	8-MB AGP 4x nVanta Video Board 32-MB AGP 4x nVanta Gforce Video Board 32-MB AGP 4x nVanta TnT2 Pro Video Board
16*	3Com PCI 3C905C 10/100 TX-M Network Board Intel PCI Pro 100+ 10/100 Network Board (with WOL) Accton PCI 10/100 TX4 or TX5 Network Board
17*	3Com 56K PCI Modem Board or Equivalent
18	Retention Bar for Expansion Boards and Slot Covers
19	Power Supply, 235 Watt
20	Internal Hard Drive Bracket
21	Thumbscrews for Chassis Cover (2)
22	Chassis Cover
23	U-shaped Chassis Shell
24	Foot Pads (8)
25	Diskette Drive Bracket
26	Diskette Drive Bracket Cover
27	3 1/2-Inch Blank Panel
28	Diskette Drive, with Bezel
29*	40X CD-ROM IDE Drive 12X or higher DVD-ROM IDE Drive 8x4x32x CD-RW IDE Drive
30*	Iomega Zip Drive ATAPI 250 MB
31	5 1/4" Mounting Rail Kit (8)
32	LED/Switch Bracket and Cable Assembly
33	LED/Button Assembly
34	Bay EMF Shield (5 1/4")
35	Bay Cover (5 1/4")
36	Front Panel
37	USB Port Board Assembly
38*	10-GB or higher EIDE Smart Hard Drive, 5400 rpm or higher, DMA/66
39*	10-Watt Speakers w/Cables and Power Adapter, NEC (not shown)
40*	Speaker Power Adapter (not shown)
41	Logo, NEC PowerMate (not shown)

---

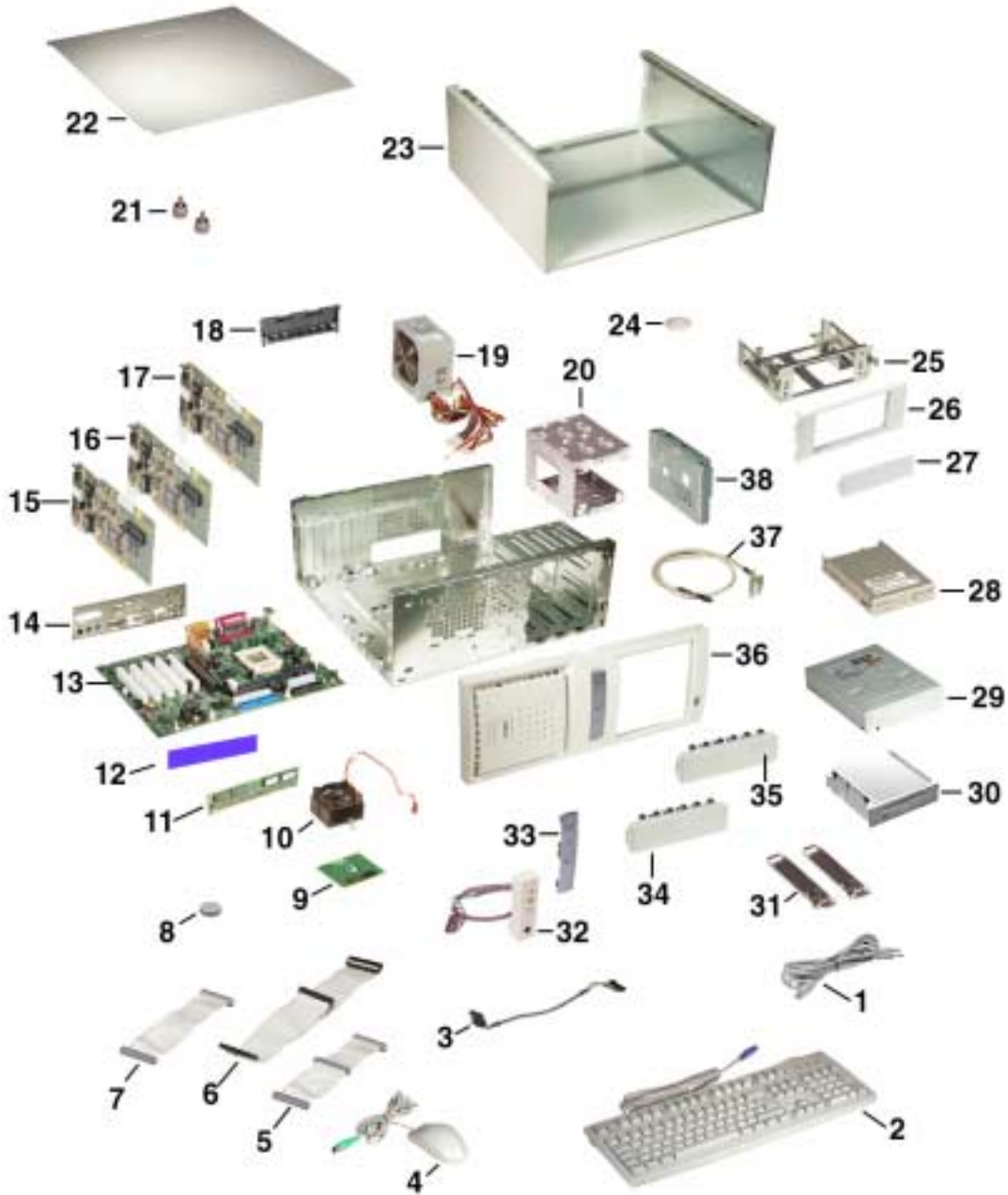
\* Built-to-order component

---

## Illustrated Parts Breakdown

The following figure shows the illustrated parts breakdown (IPB) for the PowerMate CT system. Each FRU on the IPB is identified with a number that cross-references to the FRU list.

*PowerMate CT System Illustrated Parts Breakdown*



# 6

## Preventive Maintenance


- System Cleaning
  - Keyboard Cleaning
  - Mouse Cleaning
-

---

This section contains general information for cleaning and checking the system, keyboard, and monitor.

The system unit, keyboard, and monitor require cleaning and checking at least once a year, and more often if operating in a dusty environment. No other scheduled maintenance is required.

---

 **WARNING** Unplug all power cords before performing any maintenance. Voltage is present inside the system and monitor even after the power is off. All voltage is removed only when the power cord is unplugged.

---

## ***System Cleaning***

Use the following procedure for cleaning the system.

1. Power off the system and unplug all power cables.
2. Wipe the outside of the system, keyboard, mouse, and monitor with a soft, clean cloth. Remove stains with a mild detergent. Do not use solvents or strong, abrasive cleaners on any part of the system.
3. Clean the monitor screen with a commercial monitor screen cleaning kit. As an alternative, use a glass cleaner, then wipe with a clean lint-free cloth.
4. Local distributors and dealers may sell diskette drive head cleaning kits. These kits contain special diskettes and cleaning solution. Do not use the abrasive head cleaning kits (kits without cleaning solution).


Insert the diskette immediately after powering on the system, before disk bootup. Allow the diskette drive heads to clean for about 30 seconds.

## ***Keyboard Cleaning***

As necessary, inspect and clean the inside of the keyboard as follows.

1. Turn the keyboard over and remove the screws holding the keyboard enclosure together.

---

 **CAUTION** The keyboard and cable together are considered a whole-unit, field-replaceable assembly. Therefore, disassembly of the keyboard is necessary only when cleaning the inside.

---

2. Separate the two halves of the enclosure.
3. Clean the enclosure and keys with a damp cloth. Use a small, soft-bristle brush to clean between the keys.

Do not wet or dampen the keyboard's printed circuit board. If the board gets wet, thoroughly dry it before reattaching the keyboard to the system unit.

---

## Mouse Cleaning

The mouse has a self-cleaning mechanism that prevents a buildup of dust or lint around the mouse ball and tracking mechanism under normal conditions. Periodically, however, the mouse ball must be cleaned. Use the following procedure to clean the mouse.

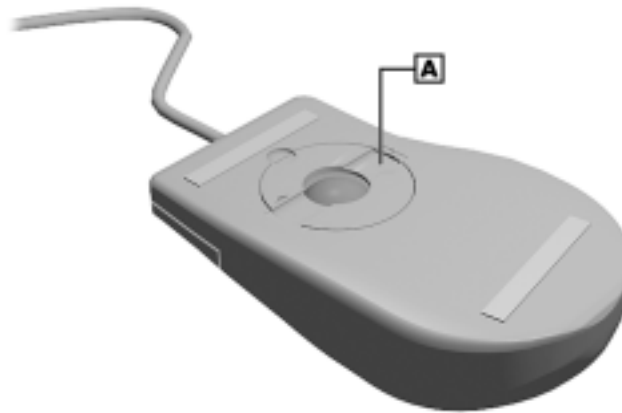
---

**Note** The following procedure describes the general procedure for cleaning a typical mouse. Depending on the mouse you have, the procedure and mouse configuration might differ from the following.

---

1. Unplug the mouse from the system.
2. Turn the mouse upside down and locate the ball cover.
3. Turn the ball cover counterclockwise and remove the cover.

### *Locating the Mouse Ball Cover*



A – Mouse Ball Cover

4. Turn the mouse over and remove the ball.
5. Clean the mouse as follows:
  - Clean the mouse ball with tap water and a mild detergent, then dry it with a lint-free cloth.
  - Remove any dust and lint from the mouse socket.
  - Use a Q-tip to remove accumulated dirt.
6. Replace the mouse ball in its socket.
7. Replace the ball cover and turn it clockwise until it locks in place.
8. Connect the mouse to the mouse port.
9. Plug in the AC power cord and press the power/sleep button.



# 7

## Troubleshooting

- Checklist
- Diagnostics

---

This section provides information to help isolate and repair system malfunctions at the field level. The system has a built-in program that automatically checks its components when the system is powered on. If there is a problem, the system displays an error message. If this happens, follow any instructions on the screen.

If screen messages do not help or an error message does not appear, refer to the information in this section to help determine and correct the problem. For the more common problems, refer to “Checklist” for assistance. If the information in the checklist does not help, refer to “Diagnostics” for more detailed problem solving.

If disassembly is required, see Section 3, “Disassembly and Reassembly.” Jumper setting information is given in Section 2, “System Configuration” and in Section 4, “System Board.”

## **Checklist**

Check the following information for a match to a system or component problem and the possible cause and solution.

### **System Problems**

- **No power and power lamp not lit.**

Check that the power switch is on.

Check that the power cable is plugged into the system power socket and that the other end is plugged into a live, properly grounded AC power outlet or surge protector.

Check the outlet or surge protector by plugging in a lamp.

- **Non-System Disk error message displays when the system is started.**

A diskette is in the diskette drive, and the diskette drive is set before the hard drive in boot order. Remove the diskette from drive A and restart the system.

- **Operating system not found error message displays when the system is started.**

If a CD is left in the CD-ROM drive, the system may not be able to boot. Try removing the CD and rebooting.

- **System does not boot and error message displayed on screen.**

Run the Setup Utility (see Section 2, “System Configuration”). Check that the parameters are set correctly, particularly if you just installed an option.

- **System emits continuous beeps.**

Turn the system off, wait at least five seconds, and turn the system on. If the beeps continue, call NECC Technical Support Center (see Section 8, “NECC Information Services” for telephone numbers).

- **System does not maintain date, time, or system configuration information.**

Replace the CMOS battery (see “CMOS Battery” in Section 3, “Disassembly and Reassembly”).

- **System does not boot from hard drive.**

The system usually tries to start from the diskette drive before it starts from the hard drive. Remove the diskette from the diskette drive.

Run the Setup Utility (see Section 2, “System Configuration”) and set the Boot parameter to hard disk device instead of floppy disk device.

---

- **System performance appears sluggish.**

Check that the system is set for optimal operation. See the operating system documentation.

Check the memory requirements of the software applications. If required, install additional RIMM memory (see Section 4, “System Board,” information on installing memory).

If optional RIMM memory was added, check that it is correctly installed.

- **System password forgotten.**

Clear the password and reset it. See “Security Menu” in Section 2, “System Configuration.”

- **System shuts off instead of going into sleep mode.**

The power/sleep button might have been held in for four seconds or more. For sleep mode, press the button and immediately release.

- **System does not shut off after pressing the power/sleep button.**

The power/sleep button might not have been pressed in and held long enough. Press in the button and hold for four or more seconds before releasing.

## ***Diskette Drive Problems***

Check the following to see the possible cause and solution.

- **Diskette won't load.**

Check that the drive does not have a diskette in it.

Check that the diskette is being loaded correctly.

Check that the system and monitor power lamps are on and the power-on screen appears.

Check that the diskette is formatted. If not, format it. See the operating system documentation.

Check that the diskette size is 1.44 MB.

If the diskette drive busy lamp does not light when loading the diskette, try a different diskette. If this loads, the problem is in the software.

- **Non-System Disk or Disk Error message displayed.**

If trying to boot from the diskette drive, insert a diskette with system files into drive A.

If a bootable diskette does not boot, use the Setup Utility to verify that the initial boot parameter is set to diskette drive A and not a hard drive.

## ***Monitor Problems***

Check the following problems to see the possible cause and solution.

- **Monitor screen is dark or the display is hard to read.**

Check that the monitor is on.

Check that the monitor power cable is connected to the monitor and a power outlet, the monitor signal cable is connected to the system, and the brightness and contrast controls are adjusted.

Press the space bar or move the mouse to take the system out of the power management mode.

---

- **Distorted image appears on the monitor screen.**

Adjust the monitor's video controls.

If this does not help, turn the monitor off for several seconds, then back on.

- **There is constant movement on the screen.**

A magnetic field is affecting the monitor. Move any devices (fan, motor, another monitor) that generate magnetic fields away from the monitor.

- **The screen display is fuzzy or flickering; graphics characters or garbage appears on the screen.**

Check that the monitor is set up correctly and that all connections are correct.

Check that the video refresh rate and video driver are correct.

Check display properties. Click the right mouse button anywhere on the Windows desktop and a menu appears. Click **Properties** and the Display Properties window appears.

### ***Keyboard/Mouse Problems***

Check the following problem to see the possible cause and solution.

- **Mouse or keyboard does not respond.**

The mouse and keyboard might have been connected after turning on the system. Turn the system off, make sure the mouse and keyboard are connected, and turn the system back on.

- **Image appears on screen but nothing happens when using the mouse or keyboard.**

Make sure the keyboard or mouse cable is firmly connected to the rear of the system.

If this does not help, turn off the system, wait five or more seconds, and turn on the system.

- **Mouse cursor moves erratically or not at all.**

Clean the mouse (see "Section 6, "Preventive Maintenance").

If this does not help, the mouse might need to be replaced.

### ***CD-ROM Drive Problems***

Check the following problems to see the possible cause and solution.

- **The system does not see the CD-ROM drive.**

The drive designation is wrong and should be changed. The drive designation for the drive depends upon the storage device configuration in the system. To find out what drive designation letter is assigned to the drive, double click **My Computer** on the Windows 98, Windows 2000, or Windows NT 4.0 desktop. The drive designation is below the drive icon.

As an alternative, open Windows Explorer and scroll down the list of folders until you locate the drive icon. The drive designation is next to the icon.

- **The CD-ROM drive is not reading a disc.**

Check that the disc is inserted in the CD tray with the printed label side up.

Check that the disc is a data disc, not a music disc.

Clean the non-label side of the disc with a soft lint-free cloth, gently rubbing from the center of the disc to the outer edge of the disc. Or use a commercial CD-ROM disc cleaner.

Try a different CD to see if the problem is limited to one CD.

- 
- **The CD does not eject due to a power failure or software error.**

Insert the end of a paper clip into the CD-ROM emergency eject hole. Press inward on the clip to open the CD-ROM door.

- **The CD-ROM drive plays music CDs but the sound is not heard.**

Check that the speaker power is on (see “Speaker Problems”).

If the speaker set has a volume control, adjust the volume control on the speakers.

Check the volume control in the system tray along the taskbar.

Check that the cable connecting the CD-ROM drive to the system board CD audio connector is in place and secure.

## ***Speaker Problems***

Check the following problems to see the possible cause and solution.

- **No sound from the speakers.**

If the speaker set has a volume control, check that the volume control is turned up.

Check that the speaker power is on. Verify that all speaker cable connections are correct and secure.

Check that the power adapter is connected to the power source and the speaker.

If using a headphone, check that it is not plugged in. Plugging in the headphone turns off the speaker set.

- **Speaker volume is too low.**

If the speaker set has a volume control, adjust the volume control on the speaker. If the volume is still too low, adjust the volume through the system software. See the Windows Multimedia online help.

- **Sound is only coming from one speaker.**

Balance the speaker output by adjusting the balance in the sound software. See the Windows Multimedia online help.

---

## Diagnosics

One beep indicates that the system has completed its POST test. If intermittent beeping occurs, power off the system and try again. If the beeping persists, see the following table. The table summarizes problems that may develop during system operation and lists (in sequential order) suggested corrective actions.

### *Problems and Solutions*

<b>Problem</b>	<b>Symptom</b>	<b>Solution</b>
No power	Power lamp on computer front panel does not light.	<ol style="list-style-type: none"><li>1. Check that the power cord is plugged into the power socket on the computer.  Check that the other end of the cord is plugged into a live, properly grounded AC power outlet.</li><li>2. Check cable connections between the power supply and system board and between the system board and power switch.</li><li>3. Systematically eliminate possible shorted PCBs by removing cables and expansion boards.</li><li>4. Check +5 and +12 power supply voltages. Measure voltages with system board installed.</li><li>5. Replace the power switch assembly.</li><li>6. Replace the power supply.</li><li>7. Replace the system board.</li></ol>
Power supply malfunction	Any of the following conditions could occur:  Front panel lamps out, diskette and/or hard drives do not spin, monitor blank, interface ports not working, and keyboard lamp out and/or cannot input from keyboard.	<ol style="list-style-type: none"><li>1. Perform steps 1 through 4 listed in this table under No Power.</li><li>2. Check power supply voltages. Voltages should be measured with a load on them (system board plugged in).</li><li>3. Replace the power supply.</li></ol>
Operating system does not boot	Intermittent beeping at power-on. Computer beeps more than once and is unable to complete boot-up.  "Invalid Configuration" message displayed.	<ol style="list-style-type: none"><li>1. Check system configuration (see Section 2).</li><li>2. Check all jumper settings and verify that drives are enabled (see Section 2).</li><li>3. Reseat RIMM(s), continuity module, and option boards in their connectors. Inspect system board for foreign objects such as paper clips.</li><li>4. Remove option boards and reboot.</li><li>5. Replace system board.</li></ol> <ol style="list-style-type: none"><li>1. Press <b>F2</b> to run Setup and correct the parameters.</li><li>2. Replace the CMOS battery (see Section 3) if the date and time must be set each time the system is powered on.</li></ol>

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## ***Problems and Solutions***

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<b>Problem</b>	<b>Symptom</b>	<b>Solution</b>
Operating system does not boot (cont'd)	System halts during loading sequence.	<ol style="list-style-type: none"><li>1. Power the system off. Check for proper jumper settings (see Section 2), then power-on the system.</li><li>2. Check the condition of the selected bootload device (diskette, disc, or hard disk) for bad boot track or incorrect OS files.</li><li>3. Try booting OS from diskette or disc, or recopy OS files onto hard disk.</li><li>4. Verify correct hard disk is selected.</li></ol>
Diskette drive does not work	Lamp on drive panel does not light when diskette is loaded.	<ol style="list-style-type: none"><li>1. Check power and signal cable connections between diskette drive and power supply.</li><li>2. Check diskette drive cable. Replace as necessary.</li><li>3. Check power supply.</li><li>4. Replace diskette drive.</li><li>5. Replace system board.</li></ol>
Hard drive malfunction	Hard drive lamp does not light but hard drive can be accessed.	<ol style="list-style-type: none"><li>1. Check cable connections between lamp and system board.</li></ol>
	Hard drive controller failure message displayed.	<ol style="list-style-type: none"><li>1. Check that the IDE channel and hard drive are enabled in Setup (see Section 2).</li></ol>
	Cannot access hard drive.	<ol style="list-style-type: none"><li>1. Check signal/power connections between hard disk, system board, power supply.</li><li>2. Check hard drive jumper settings.</li><li>3. Check power supply.</li><li>4. Check hard drive cable and hard drive. Replace as necessary.</li><li>5. Replace system board.</li></ol>
Memory malfunction	Total memory not recognized.	<ol style="list-style-type: none"><li>1. Reseat RIMM(s) and continuity module.</li><li>2. Systematically swap RIMMs.</li><li>3. Check to see if the RIMM configuration is valid (see Section 4).</li><li>4. Replace RIMM(s) or continuity module.</li><li>5. Replace system board.</li></ol>

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## **Problems and Solutions**

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<b>Problem</b>	<b>Symptom</b>	<b>Solution</b>
Keyboard or mouse malfunction	Monitor has prompt, but cannot input data using keyboard or mouse.	1. Check keyboard/mouse plugged in.
		2. Clean mouse
		3. Check password (see Section 2).
		4. Disable password (see Section 2).
		5. Replace keyboard (or mouse).
		6. Replace system board.
Monitor malfunction	Unable to synchronize display.	1. Adjust the monitor's synchronization controls.
		2. Check that the monitor's resolution matches the video setting or the video driver used.
		3. Check that the utility is not selecting a refresh rate/resolution that is not supported by the monitor.
		4. Check that the driver used matches the capabilities of the video controller and DRAM.
	Wavy display.	1. Check that the system and monitor are not near motors or electric fields.
	Blank display.	1. Press any key or move the mouse to ensure power management has not blanked the display.
	2. Check that the monitor power On/Off switch is On.	
	3. Adjust brightness and contrast controls on the monitor.	
	4. Check that the monitor cable is attached to the video connector at the back of the system.	
	5. Check cable connections between the AC power supply and monitor.	
	6. Replace monitor.	
CD-ROM drive malfunction	System power not on.	1. Turn system power on.
	Disc tray does not open.	1. System power not on. Turn system power on.
		2. System power failed. Insert the end of a straightened paper clip into the emergency eject hole, then gently press inward until the tray opens.

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## ***Problems and Solutions***

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<b>Problem</b>	<b>Symptom</b>	<b>Solution</b>
CD-ROM drive malfunction (cont'd)	No sound from CDs.	<ol style="list-style-type: none"><li>1. Check that speaker power is on and volume is adjusted.</li><li>2. Check audio software settings.</li><li>3. Check the CD.</li><li>4. Check the CD-ROM drive audio cable connections.</li><li>5. Check the CD-ROM drive audio cable. Replace as necessary.</li><li>6. Replace the CD-ROM drive.</li><li>7. Replace the system board.</li></ol>
	Cannot access CD-ROM drive.	<ol style="list-style-type: none"><li>1. Check that the CD-ROM driver software is loaded and not corrupted.</li><li>2. Check signal and power connections between the CD-ROM drive, system board, and power supply.</li><li>3. Check the master/slave jumper settings (see Section 2).</li><li>4. Check the interface cable. Replace as necessary.</li><li>5. Check the power supply. Replace as necessary.</li><li>6. Check the system board. Replace as necessary.</li></ol>

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## **NECC Information Services**

- Service Telephone Numbers
- Technical Support

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This section contains the following NECC service and support information:

- service and support telephone numbers
- technical support.

## ***Service Telephone Numbers***

The following table lists the telephone numbers for the NECC service and support functions.

### ***NECC Service and Support Telephone Numbers***

<b>Service</b>	<b>Telephone Numbers</b>
To contact NECC Technical Support Center (TSC):	In the U.S. and Canada, call 1 (800) 632-4525
To order spare parts:	Call 1 (800) 632-4525
To send technical questions by email:	tech-support@nec-computers.com/
To fax technical questions to customer support:	In the U.S., fax 1 (801) 981-3133
To access the NECC website:	www.nec-computers.com/
To access the NECC FTP site:	ftp.neccsdeast.com/

## ***Technical Support***

The following sections provide information for obtaining technical support from NECC. If you have access to a telephone, modem, and/or fax machine, you can use these services to obtain information on a 24-hour basis.

### ***NECC Website***

If you have an Internet connection, you can access the NECC website. The NECC website contains general information about NECC and its products. The website also contains press releases, reviews, and service and support information.

Look in the Service and Support area for the following:

- technical documentation, including Frequently Asked Questions, user's guides, reference manuals, and warranty information
- BIOS updates, drivers, and setup disk files to download
- contact information, including telephone numbers for Technical Support and links to vendor websites
- an automated email form for your technical support questions
- a Reseller's area (password accessible).

To access the NECC Home Page, enter the following Internet Uniform Resource Locator (URL) in your browser.

**www.nec-computers.com**

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## **NECC FTP Site**

You can use the Internet to access the NECC FTP (file transfer protocol) site to download various files (video drivers, printer drivers, BIOS updates, and Setup Disk files). The files are essentially the same as on the NECC website.

To access the NECC FTP site, enter the following Internet ftp address through your Internet Provider.

**ftp.neccsdeast.com**

Once in the file menu, follow the prompts to choose and download the file(s) you want.

## **Email/Fax Technical Support Service**

The NECC Technical Support Center offers technical support by Internet email if you have access. The Internet email address is:

**tech-support@nec-computers.com**

You can also fax technical questions to the NECC Technical Support Center if you have access to a fax machine or fax/modem. The fax number is:

**1 (801) 981-3133**

When using the email or fax support service, please include one of the following words in the subject field for prompt response from the appropriate technical person:

- Desktop
- Monitor
- Notebook.

Provide as much specific information in your questions as possible. Also, if sending a fax, please include your voice telephone number and your fax number with the question. You will receive a response to your questions within one business day.

## **Technical Support Center**

NECC also offers direct technical support through its Technical Support Center. (NECC technical support is for U.S. and Canadian customers only; international customers should check with their sales provider.)

Direct assistance is available 24 hours a day, 7 days a week. Call the NECC Technical Support Center, toll free, at 1 (800) 632-4525 (U.S. and Canada only) for the following support.

- System hardware - toll-free phone support is limited to the length of the standard warranty. For hardware support after the standard warranty, obtain system hardware support for a fee.
- Preinstalled software - toll-free phone support for 90 days from the time of your first call to the NECC Technical Support Center. After the initial 90 days, obtain preinstalled software support for a fee.

Please have available your system's name, model number, serial number, and as much information as possible about your system's problem before calling.

For callers outside the U.S. and Canada, please contact your local NECC sales provider.

# 9

## Specifications

- System Board
  - Keyboard
  - Mouse
  - Speakers
  - System Unit
  - Hard Drives
  - Diskette Drive
  - CD-ROM Drives
  - CD-RW Drive
  - DVD-ROM Drives
  - Zip Drive
  - Modem Boards
  - Network Boards
  - ATX Power Supply
  - Environmental and Safety
  - Compliance
-

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This section contains the specifications for the various components comprising the PowerMate CT systems. The following table lists the specifications and the pages where the specifications can be found.

### ***System Specifications***

<b>Specification</b>	<b>Go to Page</b>
System board	9-2
Keyboard	9-3
Mouse	9-3
Speakers	9-4
System Unit	9-4
Hard drives	9-5
Diskette drive	9-8
CD-ROM drives	9-8
CD-RW drive	9-9
DVD-ROM drives	9-9
Zip drive	9-10
Modem board	9-11
Network board	9-11
Power supply	9-12
Environmental and safety	9-12
Compliance	9-13

## ***System Board Specifications***

The specifications for the system board are included in the following table.

### ***System Board Specifications***

<b>Feature</b>	<b>Specification</b>
System Board	Gigabyte GA-6CX7
Pentium III Processor	667-MHz or higher processor, 133-MHz or higher FSB
Pentium III L1 Cache	32 KB primary cache (16-KB data, 16-KB instruction)
Pentium III L2 Cache	256 KB secondary cache
Flash ROM	4 Mb FLASH ROM

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## **System Board Specifications**

<b>Feature</b>	<b>Specification</b>
Chip Set	Intel 820 with 82820 Memory Controller Hub, 82801AA I/O Controller Hub, 82802AA Firmware Hub, Audio-Codec 97 Controller, and System Manageability Bus
I/O Controller	Winbond W83627HF-AW Super I/O controller
System Memory	64 MB to 512 MB in two RIMM sockets on system board
Optional RIMM Modules	64-MB, 128-MB, 256-MB (as available); 184-pin, 64-bit RIMMs; each RIMM module supports up to eight RDRAMs per side and up to 800 MHz (PC800) transfer rates
Sound	Yamaha YMF 752-S audio chipset, AC97 Revision 2.1 compliant
Graphics Memory	8 MB or higher, depending on AGP video board
Battery	Replaceable coin-type battery

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## **Keyboard Specifications**

The specifications for the keyboard are included in the following table.

### **Keyboard Specifications**

<b>Feature</b>	<b>Specification</b>
Keyboard	Cherry Win95 Enhanced
Dimensions	Width: 7.1 inches (18.0 cm) Length: 15.9 inches (40.4 cm) Height: 1.4 inches (3.6 cm)
Weight	3.5 lb. (1.6 kg)

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## **Mouse Specifications**

The specifications for the mouse are included in the following table.

### **Mouse Specifications**

<b>Feature</b>	<b>Specification*</b>
Physical Features	Length: 4.53 inches Width: 2.6 inches Height: 1.52 inches Weight: 170 grams +/- 20 grams
Temperature Range	Operating: 5° to 35° C Storage: -20° to 60° C

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\*Specifications may vary by model.

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## Speaker Specifications

The specifications for the optional speaker set are included in the following table.

<b>Speaker Specifications</b>	
<b>Feature</b>	<b>Specification</b>
Speakers	NEC
Features	Magnetically shielded 10-watt stereo speakers 15-volt AC power adapter
Performance	Frequency response, 90-20 kHz, 2 dB Sensitivity, 300 mV Output power, 4.5 watts

## System Unit Specifications

The specifications for the system unit are included in the following table.

<b>System Unit Specifications</b>	
<b>Feature</b>	<b>Specification</b>
Dimensions (minitower)	Width: 6.83 inches (175 mm) Depth: 17.75 inches (455 mm) Height: 17.36 inches (445 mm)
Dimensions (desktop)	Width: 17.36 inches (445 mm) Height: 6.83 inches (175 mm) Depth: 17.75 inches (455 mm)
Weight	20.3 lb. (9.2 kg)
Device Slots	Two 5 1/4-inch front accessible slots Two 3 1/2-inch front accessible slots Three 3 1/2-inch internal slots
Expansion Board Slots	Five 32-bit PCI slots
Peripheral Interface (rear panel)	PS/2-style keyboard connector PS/2-style mouse connector Two RS-232C serial ports MIDI/Game port Parallel printer port VGA monitor port One universal serial bus port Three audio connectors
Front Panel	Power/sleep button Power/sleep indicator lamp Hard drive busy indicator lamp One universal serial bus port



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## Hard Drive Specifications

Systems come with a 10-GB or higher Ultra DMA/66 hard drive capable of 5,400 or higher rotations per minute (RPM). The specifications for typical hard drives are provided in the following tables.

### Quantum Hard Drive Specifications

Feature	Specification
Hard Drive	10.2 GB
Features	Ultra ATA/66 Interface Shock Protection System II (SPS II) Data Protection System (DPS)
Typical Seek Time	
Average	9.5 ms
Track-to-Track	2.0 ms
Full Stroke	18.0 ms
Average Rotational Latency	5.56 ms
Rotational Speed	5,400 RPM
Internal Data Rate	Up to 297 Mb/sec
Buffer Size	512 KB
Temperature (non-condensing)	Operating: 5° to 55° C (41° to 131°F) Non-operating: -40° to 65°C (-40° to 160°F)
Humidity (non-condensing)	Operating: 5% to 85% rh, 30°C (86°F) Non-operating: 5% to 95% rh, 40°C (104°F)
Dimensions	Width: 4.00 inches (101.6 mm) Length: 5.75 inches (146.1 mm) Height: 1.00 inches (25.4 mm)
Weight	1.26 lbs (580 g)

\*Specifications may vary by model.

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### **Maxtor 5,400 RPM Hard Drive Specifications**

<b>Feature</b>	<b>Specification</b>
Model	15.4 MB — 31536U2 20.5 MB — 32049U3 30.7 MB — 33073U34
Heads/Disks	
15.4 MB	2/1
20.5 MB	3/2
30.7 MB	4/2
Seek Times (typical)	
Track to Track	1 ms
Average	< 9.5 ms
Maximum	< 20 ms
Average Latency	5.55 ms
Rotation Speed	5,400
Data Transfer Rates	
to/from interface	up to 66 MB/sec
to/from media	up to 40.8 MB/sec
Interface	ATA-5/UDMA 66
Buffer Size	512 KB
Buffer Type	SDRAM
Data Zones per Surface	16
Bytes per Sector/Block	512
Temperature (non-condensing)	Operating: 5° to 55° C (41° to 131°F) Non-operating: -40° to 71°C (-40° to 160°F)
Humidity (non-condensing)	Operating & Non-operating: 5% to 95% rh, 30°C (86°F)
Altitude	Operating: -200 to 10,000 ft. Non-operating: -200 to 40,000 ft.
Dimensions	Height: 1.02 inches (26.2 mm) Length: 5.77 inches (147.9 mm) Width: 4.02 inches (103.1 mm)
Weight	1.3 lbs (0.59 Kg)

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\*Specifications may vary by model.

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### **Maxtor 7,200 RPM Hard Drive Specifications**

<b>Feature</b>	<b>Specification</b>
Model	20.5 MB — 52049U4 30.7 MB — 53073U6
Heads/Disks	4/2
Seek Times (typical)	
Track to Track	1 ms
Average	< 9.0 ms
Maximum	< 20 ms
Average Latency	4.17 ms
Rotation Speed	7,200
Data Transfer Rates	
to/from interface	up to 66.7 MB/sec
to/from media	up to 43.2 MB/sec
Interface	ATA-5/UDMA 66
Buffer Size	2 MB
Buffer Type	SDRAM
Data Zones per Surface	16
Bytes per Sector/Block	512
Temperature (non-condensing)	Operating: 5° to 55° C (41° to 131°F) Non-operating: -40° to 71°C (-40° to 160°F)
Humidity (non-condensing)	Operating & Non-operating: 5% to 95% rh, 30°C (86°F)
Altitude	Operating: -200 to 10,000 ft. Non-operating: -200 to 40,000 ft.
Dimensions	Height: 1.02 inches (26.2 mm) Length: 5.77 inches (147.9 mm) Width: 4.02 inches (103.1 mm)
Weight	1.3 lbs (0.59 Kg)

\*Specifications may vary by model.

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## Diskette Drive Specifications

Specifications for a typical diskette drive are included in the following table.

### *Diskette Drive Specifications*

<b>Feature</b>	<b>Specification*</b>
Recording Capacity	High density mode: Unformatted: 2.00/1.00 MB Formatted: 1440 KB (512B 18 Sec) 720 KB (256B 18 Sec) Normal density mode: Unformatted: 1.00/0.50 MB Formatted: 640 KB (256B 16 Sec) 320 KB (128B 16 Sec)
Data Transfer Rate	High density mode: 500/250 Kbit/sec Normal density mode: 250/125 Kbit/sec

\*Specifications may vary by model.

## CD-ROM Drive Specifications

The specifications for the NEC 40X CD-ROM drive are included in the following table.

### *NEC CD-ROM Drive Specifications*

<b>Feature</b>	<b>Specification*</b>
40X CD-ROM Drive	NEC CDR-8401B
Interface	ATAPI/EIDE/Ultra DMA 33 Plug and Play supported
Access Time	75 ms (typical)
Data Transfer Rate, Max:	6000 KB/sec
Buffer Size	128 KB
Supported Disc Formats	CD-R/RW, CD-IFMV, Photo CD, CD-extra, Video CD, CD- ROM, CD-DA
Weight	0.9 kg

\*Specifications may vary by model.

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## CD-RW Drive Specifications

The specifications for the 8x4x32x CD-RW drive are included in the following table.

### CD-RW Drive Specifications

Feature	Specification*
CD-RW Drive	NEC
Write/Read Speeds:	
Write	2x, 4x, 8x
Write/Read	2x, 4x
Read	32x
Data Transfer Rate	Max, 4,800 KB/sec
Access Time	100 ms
Buffer Size	2 MB
Interface	ATAPI/EIDE/Ultra DMA 33
Writing Method:	Disc at Once Session at Once Track at Once Variable or Fixed Packet Write Multi-session
Dimensions	
Width	146 mm
Depth	201 mm
Height	41.5 mm

\*Specifications may vary by model.

## DVD-ROM Drive Specifications

The specifications for a typical 12X DVD-ROM drive are included in the following table.

### DVD-ROM Drive Specifications

Feature	Specification*
8X DVD-ROM Drive	
Interface	Enhanced IDE (ATAPI)
Memory Buffer	512 Kbytes
Supported Modes	CD-Audio, CD-ROM (Mode 1 and Mode 2), CD-XA (Mode 2, form 1 and form 2), CD-I (FMV), Video CD, CD Extra, CW-RW, CD-Text, Multisession Photo CD, Single Session Photo CD
Capacity	DVD, 4.7 GB (single-layer disc) or 8.5 GB (double-layer disc) CD, 650 MB
Temperature	5°C to 45°C (Operating) -20°C to +60°C (Non-operating)

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### **DVD-ROM Drive Specifications**

<b>Feature</b>	<b>Specification*</b>
Humidity	15% to 85% relative humidity (Operating) 10% to 90% relative humidity (Non-operating)
Weight	1 Kg (2.2 lb.)
Dimensions	146 mm wide, 41.3 mm high, 190 mm depth

\*Specifications may vary by model.

### **Zip Drive Specifications**

The specifications for the 250-MB Zip drive are included in the following table.

#### **Zip Drive Specification**

<b>Feature</b>	<b>Specification</b>
Zip Drive	Imomega Zip 250 ATAPI 2 Drive
Sustained Data Transfer Rate	Up to 8 Mbits/sec
Seek Times:	Minimum 4.0 ms Average 29.0 ms Maximum 55.0 ms
Removable Zip Cartridge Capacity	Uses 250 MB and 100 MB cartridges
Dimensions:	Height 1.7 in. (44 mm) Width 5.4 in. (139 mm) Depth 7.5 in. (193 mm)
Weight	15.4 ounces (440 grams)
Relative Humidity (Noncondensing)	10% to 80% (operating)
Operating Temperature	10°C to 32°C

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## Modem Board Specifications

The specifications for a typical optional modem board are included in the following table.

### **Modem Board Specifications**

<b>Feature</b>	<b>Specification*</b>
Modem Board	3Com V.90
Data (maximum speed)	V90 ITU 56 Kbps ITU-T V.23 ITU-T V.34+ ITU-T V.22bis ITU-T V.34 ITU-T V.22 ITU-T V.32bis Bell 212A ITU-T V.32 Bell 103
Error Control and Data Compression	ITU-T V.42 ITU-T V.42bis MNP5

\*Specifications may vary by model.

## Network Board Specifications

The specifications for the optional network boards are included in the following tables.

### **3Com 3C905C Network Board Specifications**

<b>Feature</b>	<b>Specification</b>
Topology	10Base-T, 100Base-TX-M
Bus	PCI
Data Rates	10/100 Mbps
Dimensions:	
Length	4.0 in (10.16 cm)
Width	7.0 in (17.79 cm)
Power Requirement	+5V $\pm$ 5% at 250 mA max.
Operating Voltage	+12V $\pm$ 5% at 500 mA max.
Operating Temperature	0 - 70°C (32° - 158°F)
Operating Humidity	10% to 90% (non-condensing)

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### ***Intel PRO 100+ WOL Network Board Specifications***

<b>Feature</b>	<b>Specification</b>
Topology	10Base-T, 100Base-TX
Bus	PCI 2.2
Network Management	ACPI Support Wake on LAN Intel PRO/100 Boot Agent
Data Rates	10/100 Mbps
Onboard Memory	6 KB cache
Data Transfer Mode	Bus-master DMA
Controller	Intel 82559
Power Requirement	.67 Watts @+5VDC
Operating Temperature	0 - 55°C (32° - 131°F)
Operating Humidity	85% at >55° C (131°F)

### ***ATX Power Supply Specifications***

The specifications for the ATX 235-watt power supply is included in the following table.

#### ***Power Supply Specifications***

<b>Feature</b>	<b>Specification</b>
Power Supply	235-Watt Power Supply
Voltage	115V or 230V, Switch Selectable

### ***Environmental and Safety Specifications***

The system environmental and safety specifications are included in the following table.

#### ***Environmental and Safety Specifications***

<b>Feature</b>	<b>Specification</b>
Operating Environment	Temperature: 50°F to 95°F (10°C to 35°C) Relative Humidity: 20% to 80%
Administrative Compliance	UL 1950 - safety CSA C22.2 No. 950-m89 TUV EN60950: 1988 FCC part 15, Subpart J, Class B - emissions FCC part 68 IEC 950 - safety VDE 0871/6.78, Class B - emissions



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## Compliance

The system meets the compliance standards listed in the following table.

<b>System Compliance</b>	
<b>Usage</b>	<b>Standard</b>
Domestic	FCC CFR 47 Part 15, Subpart B UL 1950 3rd edition
Canadian	C-UL C22.2 No. 950-95 ICES-003 Issue 2, Revision 1
European	CD EMC Directive 89/336 EEC EN55022:1993 Class B EN50082-1:1997 CD LVD Directive 73/23 EEC EN60950
Energy Star	All modes are Energy Star Compliant

The system meets all requirements in the European Waste Regulation Ordinance for packaging and scrap.

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# Glossary

## A

### **access time**

The time period between the supply of an access signal and the output or acceptance of the data by the addressed system. Examples are the access times for DRAMs, SRAMs, hard drives, and CD-ROM drives. Hard drive access time is the time it takes for a computer to get data from the drive. A hard drive with an 11 ms access time is fast. A CD-ROM drive with a 280-ms access time is fast.

### **ACPI**

Advanced Configuration and Power Interface. A power management specification developed by Intel, Microsoft, and Toshiba. When installed on the system, ACPI enables the operating system to control the amount of power given to each device attached to the computer. With ACPI, the operating system can turn off peripheral devices (such as CD-ROM drives) when they are not in use. As another example, ACPI enables manufacturers to produce computers that automatically power up as soon as you touch the keyboard.

### **adapter**

An expansion board or component on the system board that communicates with peripherals (such as the display monitor or network devices).

### **address**

A hexadecimal number that represents a location in storage or memory. Also used to identify communication ports. To communicate with a storage device.

### **AGP**

Accelerated Graphics Port. A high-speed, high-performance video standard supported by a dedicated connector on the system board. The connector allows the connection of an AGP board to the system board's AGP bus. AGP boards feature 64- or 128-bit graphics acceleration with an integrated digital video engine and accelerated 3-D graphics, texture mapping, and shading functions. Fast refresh rates, high resolution, and color depth allow for incredible graphics suitable for multimedia and graphic intensive applications.

### **algorithm**

Any set of instructions to be followed in order.

### **anti-aliasing**

Making jagged edges look smoother by filling in the jags with an intermediate color. Usually used in reference to the edges of shapes, especially letters, on a computer screen.

### **API**

Application Programming Interface. An API is a series of functions that programs can use to make the operating system do routine or repetitive tasks. Using Windows APIs, for example, a program can open windows, files, and message boxes (as well as perform more complicated tasks) by passing a single instruction. Windows has several classes of APIs that deal with telephony, messaging, and other issues.

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**APM**

Advanced Power Management. An API developed by Intel and Microsoft that allows developers to include power management in the BIOS. APM defines a layer between the hardware and the operating system that effectively shields the programmer from hardware details.

**application programs**

Software designed to perform specific functions or a group of functions, like solving business or mathematical problems. Examples of applications include word processing, communications, or database management.

**architecture**

A general term for the design and construction of computer systems, particularly hardware, but also operating systems and networks. The circuitry within a chip is called its architecture; for example, Intel architecture can refer to a computer based on the Intel Celeron, Pentium II, or Pentium III chips.

**archive**

Copying one or more files to a different location for long-term data storage, especially for backup and security purposes. Files can then be added to or deleted from the archive. Also refers to the location where data is stored.

**ASIC**

Application Specific Integrated Circuit. A chip designed for use on a particular circuit board, or for a very narrow range of use. The digital signal processor chip on a modem is an ASIC.

**asynchronous**

Refers to operations that do not require the clocks of communicating devices to be coordinated. Instead, the devices send signals to each other indicating readiness to receive or send. Compare synchronous.

**asynchronous cache**

The slowest, most inexpensive type of secondary SRAM cache, running at speeds of 15 to 20 ns.

**ATA**

AT Attachment. A standard for connecting hard drives or other devices to an AT bus; synonymous with IDE.

**AT bus**

The AT bus system with support chips (DMA, PIC, etc) and a 16-bit bus slot. The AT bus is strictly defined by ISA.

**audio**

Relating to or capable of producing sound. Multimedia computers make extensive use of audio.

**AVI**

A digital movie format created by Microsoft. AVI is short for "audio/video interleave," a method of including a digital movie and its accompanying sound in the same file. Files in the AVI format have the .AVI extension.

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## **B**

### **bad sector**

Part of a hard drive or diskette drive storage medium that doesn't hold data. Formatting generally detects and marks these areas so they won't be used. Certain utility programs do, too, and it is a good idea to run this type of utility occasionally to prevent data loss if the condition of the drive changes.

### **bandwidth**

A measure of how much information something can carry. Specifically, data path times frequency. For example, the ISA bus has a data path of 16 bits (it can send 16 bits at a time) and typically operates at 8.33 MHz, so it has a bandwidth of 133.28 megabits per second (Mbps).

### **base RAM**

Area of system memory between 0 and 640 kilobytes available to the user for operating system and application programs.

### **batch file**

A file that contains a series of DOS commands. Batch files have the extension .bat. If you execute a batch file, DOS attempts to carry out all the commands in the file, in order.

### **baud**

A unit of measure for modem speed. Literally, the number of voltage transitions per second. Phone line limitations limit the actual baud rate of modems to 2400 baud, although the data transmission rate (bps) may be higher because of data compression.

### **BBS**

Short for Bulletin Board Service. Software that serves as a communication and information source for computers that communicate by modem.

### **BIOS**

Basic Input/Output System. A program or set of programs permanently stored in ROM chips installed on the system board. The BIOS contains functions that control the real-time clock, keyboard, disk drives, video display, and other peripheral devices. For example, the BIOS Setup utility program is contained in the BIOS, and when you change the drive type, you change the BIOS.

### **bit**

Binary digit. The smallest unit of computer data. A single digital piece of information, generally represented by the numeral 0 or 1. Usually the transition between the states of +5V and -5V within a computer, the charge of a transistor in an integrated circuit, or the change in polarity of a magnetic region on a disk. See byte. Data compression schemes can enable the transmission of more than one bit per voltage transition.

### **bit block transfer**

Moving part of a screen image as a single block rather than moving a pixel at a time. Bit block transfers are much faster than moving the same pixels individually, and it is common in accelerated video cards.

### **bitBLT**

Bit Block Transfer.

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**bitmap**

Any occurrence where a single location in memory and a single pixel correspond. Usually applies to screen or printer output. .BMP files are bitmapped graphics files.

**bits per second**

(bps) A unit of transmission. Also called baud rate.

**block**

A contiguous section of bits considered as a whole, especially in memory. On a disk, the data in one sector; in modem data transfer, the bits between checksums.

**board**

Printed circuit board. Board onto which computer components are soldered and thin wires are printed to connect the components.

**boot**

To start up a computer. The computer is generally booted in one of three ways: by turning on the power switch (cold boot), by pressing the reset switch, or by simultaneously pressing the Ctrl, Alt, and Del keys (warm boot). Booting the system after it has already been powered up and booted is referred to as rebooting. Also the process of booting itself. Boot is from "bootstrap," a reference to a computer's ability to set itself up, or pull itself up by its own 'bootstraps.' See cold boot and warm boot.

**bootable device**

Any type of hardware that carries the information (software) required by the computer to start properly. This device must also have the capacity to be recognized by the computer in the first stages of the boot process.

**boot block**

The part of a disk that contains the software (such as the operating system loader) that enables the computer to start.

**boot sector**

The part of the boot block that contains the operating system loader, a program that starts by itself and loads the operating system.

**bps**

Bits per second. The number of bits of data that can be transmitted in one second. Because data compression schemes enable more than one bit per voltage transition, bps is equivalent to baud only if no compression is used.

**buffer**

A place, especially in RAM, for the temporary storage of data for the purpose of speeding up an operation such as printing or drive access. Data from a buffer is available more quickly than data from where the buffer got it. Typically buffers get data before it is needed so it is ready quickly when needed. Similar to cache.

**burst mode**

When a device seizes control of the bus, sends data, then relinquishes control of the bus. Any time a device sends data without interruption instead of taking turns with other devices.

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**bus**

A parallel electrical pathway on the system board, connecting and shared by the parts of a computer system (especially the CPU, its support circuitry, memory, and expansion cards), used for transmitting data or electrical power from one device to another. Typically the lines in a bus are dedicated to specific functions, such as control lines, address lines, and data lines. Different bus architectures have different numbers and arrangements of these lines, and different names (for example, ISA, PCI). The most useful way of distinguishing bus architectures is by the number of simultaneous data bits they can carry. The ISA is a 16-bit bus, while PCI is a 32-bit bus.

**bus master**

The ability of an expansion card to control the bus without needing intervention from the CPU.

**byte**

Group of eight contiguous bits. Frequently written as an eight-digit binary number or a two-digit hexadecimal number. One letter of the alphabet in ASCII code takes one byte.

**C****cache**

A special block of fast memory used for temporary storage of frequently used data for quick retrieval. A memory cache, sometimes called a cache store or RAM cache, is a portion of memory made of high-speed static RAM (SRAM) instead of the slower and cheaper dynamic RAM (DRAM) used for system memory. Memory caching is effective because most programs access the same data or instructions over and over. By keeping as much of this information as possible in SRAM, the computer avoids accessing the slower DRAM. See “write-back” and “write-through.”

**chassis**

The metal frame to which the electronic components of the computer (such as the system board, power supply, and drive bays) are attached. The chassis goes inside the system unit cover.

**checksum**

A number, calculated from a block of data, used to verify the integrity of that data. For example, a modem could send a block of data and include the number of 1's that occur in the block. The receiving modem could count the number of 1's it receives and compare its own number with the transmitted number. If the numbers are the same, the transmission was probably OK.

**clock**

Electronic timer (oscillator) used to synchronize computer operations. The oscillator generates the timing pulses that coordinate and enable the flow of data within a digital device. Also a circuit powered by battery that keeps track of the date and time for human and various system requirements.

**clock speed**

The frequency at which a clock oscillates. In microcomputers, measured in MHz. The faster the clock, the faster the computer can compute.

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**CMOS**

Complementary Metal Oxide Semiconductor. A chip on the system board that contains nonvolatile memory. CMOS is backed up by an internal lithium battery that preserves clock/calendar data and system configuration parameters stored in CMOS.

**codec**

Coder-decoder. Used primarily with Internet phone and video conferencing products, this software compresses digitized data and decompresses it at the other end, allowing for faster data transfer and less delays

**cold boot**

Process of starting up the computer by turning on the power. If power is already on, the process means to turn off the computer and turn it on again. A cold boot reinitializes all devices.

**compression**

Any scheme for recording data with fewer bits. For example, stating how many times something occurs can be shorter than stating each occurrence. It is shorter to say “print a million white pixels” than to say “print white pixel number one, print white pixel number two . . .”

**D****default**

The system’s factory setting for a specific device feature or system function. A setting that a computer uses if it has not been modified by a user.

**DIMM**

Dual Inline Memory Module. Circuit board with pins connecting to different memory chips on both sides of the board, which allows for wider and faster data transfer (128-bit). See SIMMs.

**DMA**

Direct Memory Access. A method for transferring data, usually between memory and a disk drive, without going through the CPU.

**DMI**

Desktop Management Interface. A standard for PCs that allows manipulation of PC components over a network from a centralized location.

**DRAM**

Dynamic Random Access Memory. Memory used to store data in most computers. DRAM is temporary and must be continually refreshed. It is only active when the computer is turned on.

**driver**

A software program that enables peripheral devices (for example, printer, monitor, mouse, CD-ROM drive) to work with computers.

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## **DVD**

Digital versatile disc or digital video disc. A type of CD-ROM that holds a minimum of 4.7 GB, enough for a full-length movie. The DVD specification supports disks with capacities of from 4.7 GB to 17 GB and access rates of 600 Kbps to 1.3 Mbps. One of the features of DVD drives is that they are backward-compatible with CD-ROM disks. This means that DVD players can play old CD-ROMs, CD-I disks, and video CDs, as well as new DVD-ROMs. Newer DVD players can also read CD-R disks. DVD uses MPEG-2 to compress video data. See MPEG.

## **E**

### **ECC memory**

Error Checking and Correcting memory. Advanced type of memory that can find and correct certain types of single-bit memory errors, providing greater data integrity. Advanced ECC can correct some double-bit errors.

### **ECP**

Extended Capabilities Port. A parallel-port standard for PCs that supports bidirectional communication between the PC and attached devices (such as a printer). ECP is about 10 times faster than the older Centronics standard. Another modern parallel port for PCs that offers similar performance is the EPP (Enhanced Parallel Port).

### **EDO memory**

Extended Data Out memory. A faster type of asynchronous computer memory that holds its last-requested data in a cache after releasing it. EDO memory is designed for use with the Intel Pentium processors.

### **EIDE**

Extended Integrated Drive Electronics. The EIDE specification is an enhanced version of IDE that allows for faster transfer rates and supports larger hard drive sizes

### **enhanced VGA**

A video interface that offers more colors or higher resolution than VGA.

### **EPP**

Enhanced Parallel Port, a parallel port standard for PCs that supports bidirectional communication between the PC and attached device (such as a printer). EPP is about 10 times faster than the older Centronics standard. Another modern parallel port for PCs that offers similar performance is the ECP (Extended Capabilities Port).

### **extended RAM**

The area of RAM above the first megabyte of memory in the system available for enhancing system performance.

## **F**

### **FAT**

File Allocation Table. A table near the beginning of a drive that identifies the location of everything on the drive.

### **flash ROM**

Method in which a computer's BIOS ROM can be upgraded without replacing the ROM BIOS chip.



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## **FTP**

File Transfer Protocol. A method of transferring files between two computers on a TCP/IP network (such as the Internet). “Anonymous FTP” (the most common usage on the Internet) allows a user to download files without having an account at the remote computer.

## **function key**

The set of keys on the keyboard (usually F1 through F12) that let you get help and error message information or quickly select frequently used commands.

## **G**

### **graphics accelerator**

A term referring to a higher end video controller that handles high-speed graphics and usually contains several megabytes of onboard video memory.

## **GUI**

Graphical User Interface. Method of presenting information on a computer screen utilizing icons, pull-down menus, and a mouse.

## **H**

### **hertz**

(Hz) A unit of frequency equal to one cycle per second.

### **hexadecimal**

A number system that uses 16 as the base. (Place value indicates powers of 16.) It uses the digits 0-9 and A-F. Used around computers because a byte (eight binary digits) easily converts to a two digit hexadecimal number. Hexadecimal numbers are often indicated with the letter H, a dollar sign, or a subscripted 16 after the number. Compare binary, decimal.

### **host adapter**

An expansion board that serves as a controller for SCSI devices.

### **hot key**

Combination of two or three keys (such as **Ctrl-Alt-D**) that you press simultaneously for a particular function.

### **hot plugging**

The ability to add and remove devices to a computer while the computer is running and have the operating system automatically recognize the change. The Universal Serial Bus (see USB ) external bus standard supports hot plugging. This is also a feature of PCMCIA. Hot plugging is also called hot swapping.

## **I**

### **IDE**

Intelligent Drive Electronics. A hard drive type that has controller electronics built into the drive and delivers high throughput.

### **interface**

A connection that enables two devices to communicate.

---

**interrupt**

A signal from part of a system, such as an I/O device, asking to use the CPU. Interrupts are hierarchical, which prevents interrupts from interrupting each other. (Whichever interrupt has higher priority makes the other interrupt wait.) When the CPU receives an interrupt signal, it saves what it is doing, processes the routine associated with the interrupt, then returns to what it was doing.

**I/O address**

Input-Output address. How the CPU sees an I/O port. It puts data into this address or reads the data in it. The device at the other end of the I/O port gets the data from that address or puts the data there, respectively.

**IRQ**

Interrupt Request. A signal that, when received by the CPU, makes it stop what it is going to do something else. An interrupt is a way in which a particular device in a computer communicates with the CPU. PCs have 16 IRQ lines that can be assigned to different devices (for example, printers, scanners, modems). No two devices can have the same IRQ address. See interrupt.

**ISA**

Industry Standard Architecture. The bus architecture used in the IBM PC/XT and PC/AT. The AT version of the bus is called the AT bus and has become an industry standard. The apparent successor is the PCI local bus architecture found in most of today's computers. Most modern computers include both an AT bus for slower devices and a PCI local bus for devices that need better bus performance. In 1993, Intel and Microsoft introduced a new version of the ISA specification called Plug and Play ISA. Plug and Play ISA enables the operating system to configure expansion boards automatically so that users do not need to fiddle with DIP switches and jumpers. See plug and play.

**isochronous**

A form of data transmission in which individual characters are only separated by a whole number of bit-length intervals.

**K****kilobyte**

(KB) 1024 bytes.

**L****L2 cache**

Refers to "level 2" or "secondary" cache. A type of cache that resides on the motherboard except when referring to a Pentium machine, where it resides on the CPU module.

**LAN**

Local Area Network.

**LPT1**

Name assigned to the parallel port by the Windows operating system. A second parallel device is assigned LPT2 (if there is another parallel port). Also called the printer port.

---

## **M**

### **master**

Part of a two-sided communication that initiates commands (to a “slave” that carries out the commands).

### **megabyte**

(MB) 1,048,576 bytes.

### **memory**

Electronic storage area in a computer that retains information and programs. A computer has two types of memory: read-only memory (ROM) and random access memory (RAM).

### **microprocessor**

A semiconductor central processing unit that is the principal component of a microcomputer. Usually contained on a single chip that includes an arithmetic logic unit, control logic, and control-memory unit.

### **MIDI**

Musical Instrument Digital Interface. An interface for connecting suitably equipped musical instruments to suitably equipped computers.

### **MIF**

Management Information File. A file stored on a PC that holds system data such as a model ID and serial number that can be manipulated over a network from a centralized location.

### **MMX**

A processor architecture that enhances multimedia and communications. This technology processes multiple data elements in parallel, speeding up such things as image processing, motion video, speech synthesis, telephony, and 3-D graphics.

### **modem**

MOdulator-DEModulator. A device that links computers over a telephone line.

### **MPC**

Multimedia Personal Computer, a software and hardware standard developed by a consortium of computer firms led by Microsoft. There are three MPC standards, called MPC, MPC2, and MPC3, respectively. Each specifies a minimum hardware configuration for running multimedia software.

### **MPEG**

Motion Pictures Expert Group. Audio/Video technology that allows for better than VHS quality video and almost CD quality audio by using advanced compression techniques. MPEG files allow for more realistic motion with a smaller file size than earlier formats, making it a popular format for digital full-length movies. Files in the MPEG format have an .MPG extension.

## **N**

### **nonvolatile memory**

Storage media that retains its data when system power is turned off. Nonvolatile memory is a complementary metal oxide semiconductor (CMOS) chip that is backed up by an internal battery. The backup battery preserves the clock/calendar data and system configuration parameters stored in CMOS. See volatile memory.

---

## O

### **operating system**

Set of programs that manage the overall operation of the computer.

### **overwrite**

Storing information at a location where information is already stored, thus destroying the original information.

## P

### **page**

A type of message transmission in which a message is sent or received via modem to a paging device from a computer (with paging communications software) or telephone.

### **parallel interface**

Interface that communicates eight bits at a time.

### **parallel printer**

A printer with a parallel interface.

### **parameter**

A characteristic of a device or system determined by a command or setting whose purpose is to define or limit the characteristic.

### **password**

A string of characters that the user must enter before the system allows access or system privileges.

## PCI

Peripheral Component Interface/Interconnect. A self-configuring personal computer local bus designed by Intel. Most modern PCs include a PCI bus in addition to a more general ISA expansion bus. PCI is a 32-bit bus, but supports a 64-bit extension for new processors, such as the Pentium II. It can run at clock speeds of 33 or 66 MHz. At 32 bits and 33 MHz, it yields a throughput rate of 133 megabits per second. 64-bit implementations running at 66 MHz provide 524 Mbps. See ISA.

### **peripheral**

Input or output device not under direct computer control. A printer is a peripheral device.

### **pixels**

Picture elements. Tiny dots that make up a screen image. A pixel is the smallest spot on the screen that a computer can address.

### **plug and play**

Refers to the ability of a computer system to automatically configure expansion boards and other devices. This enables a user to plug in a device and use it, without worrying about setting DIP switches, jumpers, and other configuration elements.

---

**port**

Any connection by which data can enter or leave a computer or peripheral. Provides the means for an interface between the microprocessor and external devices. A cable connector is usually plugged into the port to attach the device to the computer.

**processor**

In a computer, a functional unit that interprets and executes instructions.

**prompt**

A special symbol indicating the beginning of an input line. Also a message that appears on the screen indicating that the user must take a certain action.

**R****RAM**

Random Access Memory. A storage device into which data is entered and from which data is retrieved in a nonsequential manner. On the system board, RAM is semiconductor-based memory that can be read and written to by the microprocessor or other hardware devices. In RAM, data can be directly and randomly read or written (with any choice for the address). It's the storage location for data that needs to be immediately available for every application in use on your computer.

**RDRAM**

Rambus Dynamic Random Access Memory: Memory used to store data in computers. Rambus technology is incorporated onto dynamic-random-access-memory (DRAM) chips and the logic devices that control them. The Rambus DRAM delivers more than ten times the performance of conventional DRAMs. A single RDRAM transfers data at speeds up to 800 MHz over a narrow, Rambus Channel to Rambus compatible ICs. See DRAM.

**read**

To extract data from a storage device such as a diskette.

**RIMM**

Rambus Inline Memory Module: Circuit board with pins connecting up to eight RDRAM memory chips on each side of the board, which allows for wider and faster data transfer. See RDRAM and DIMMs.

**ROM**

Read-Only Memory. Memory in which stored data cannot be modified by the user except under special conditions.

**reset**

The process of returning a device to zero or to an initial or arbitrarily selected condition.

**resolution**

The degree of screen image clarity. Video display resolution is determined by the number of pixels on the screen. Resolution is usually specified in pixels by scan lines, for example, 640 by 480. See pixels.

**RS-232C**

Standard interface for serial devices.

---

## **S**

### **SEC**

Single-Edge Contact. The SEC cartridge containing the Pentium processor. See Slot 1.

### **serial interface**

An interface that communicates information one bit at a time.

### **serial printer**

A printer with a serial interface.

### **SGRAM**

Synchronous Graphic Random Access Memory. A type of DRAM used increasingly on video adapters and graphics accelerators. Like SDRAM, SGRAM can synchronize itself with the CPU bus clock at speeds of up to 100 MHz. In addition, SGRAM uses several other techniques, such as masked writes and block writes, to increase bandwidth for graphics-intensive functions. Unlike VRAM and WRAM, SGRAM is single-ported (it can only be accessed by one device at a time). However, it can open two memory pages at once, which simulates the dual-port nature of other video RAM technologies (access by two different devices simultaneously). See VRAM and WRAM.

### **SIMM**

Single Inline Memory Module. A small circuit board holding a group of memory chips. Typically, SIMMs hold up to nine RAM chips. On PCs, the ninth chip is for parity error checking. Unlike memory chips, SIMMs are measured in bytes rather than bits. In today's SIMMs, each chip holds 2 MB, so a single SIMM holds 16 MB. SIMMs are easier to install than individual memory chips. The bus from a SIMM to the actual memory chips is 32 bits wide. A newer technology, called dual in-line memory module (DIMM), provides a 64-bit bus. To take advantage of the 64-bit bus on Pentium processors, use either DIMMs or pairs of SIMMs. See DIMMs.

### **Slot 1**

The form factor for Intel Pentium processors. The Slot 1 package replaces the Socket 7 and Socket 8 form factors used by previous Pentium processors. Slot 1 is a 242-pin daughter card slot that accepts a processor packaged as a Single Edge Contact (SEC) cartridge. A system board can have one or two Slot 1s. See SEC.

### **SMART**

Self-Monitoring Analysis and Reporting Technology. A hard drive feature that works in conjunction with system software (for example, LANDesk Client Manager, NEC Auto Backup) for identifying a potential problem on the hard drive and automatically backing up system files to a user-specified device, such as a tape or Zip drive.

### **sound card**

An expansion card designed for sound input and output. Sound cards can record and play back digital audio. Most also have a MIDI synthesizer, which means they can play MIDI files; some also have MIDI inputs and outputs.

### **super video graphics array (SVGA)**

A color bit-mapped graphics display standard that provides a resolution of 1024x 768 with up to 256 colors displayed simultaneously.

### **synchronous**

Refers to protocols that require the clocks of the communicating machines to be coordinated.

---

**system board**

The main printed circuit board inside the system unit into which other boards and major chip components, such as the system microprocessor, are connected.

**T****tpi**

Tracks per inch.

**track**

Any of many concentric circular regions on a disk for storing data. Tracks are divided into sectors. One measure of storage density of a disk is tpi.

**U****Ultra DMA**

A protocol developed by Quantum Corporation and Intel that supports burst mode data transfer rates of 33.3 MBps. This is twice as fast as the previous disk drive standard for PCs, and is necessary to take advantage of new, faster Ultra ATA disk drives. The official name for the protocol is Ultra DMA/33.

**USB**

Universal Serial Bus. An external bus standard that supports data transfer rates of 12 Mbps (12 million bits per second). A single USB port can be used to connect up to 127 peripheral devices, such as mice, modems, and keyboards. USB also supports Plug-and-Play installation and hot plugging. It is expected to eventually replace serial and parallel ports.

**V****VESA**

Video Electronics Standards Association. The source of a SuperVGA standard used on many video boards.

**virus**

Software that copies itself onto hard drives and diskettes without user intervention, usually when a diskette is placed into the drive of a computer. Viruses usually trigger a harmless or destructive occurrence on the system, activated by some preset condition. Viruses are frequently written with antisocial intent.

**VGA**

Video Graphics Array. Graphics technology that supports up to 256 K colors and a graphics resolution of 640 by 480 pixels.

**volatile memory**

Storage media that loses its data when system power is turned off. Standard memory and memory added to the system are volatile memory. See nonvolatile memory.

---

## **VRAM**

Video RAM. VRAM is special-purpose memory used by video adapters. Unlike conventional RAM, VRAM can be accessed by two different devices simultaneously. This enables a video adapter to access the VRAM for screen updates at the same time that the CPU provides new data. VRAM yields better graphics performance but is more expensive than normal RAM. A special type of VRAM, called Windows RAM (WRAM), yields even better performance than conventional VRAM. See SGRAM and WRAM.

## **W**

### **warm boot**

Process of resetting the computer without turning off the power through keyboard input (pressing **Ctrl**, **Alt**, and **Del** keys simultaneously) or the reset button. The system returns to an initial or arbitrarily selected condition.

### **WRAM**

Windows RAM. A type of RAM that supports two ports. This enables a video adapter to fetch the contents of memory for display at the same time that new bytes are being pumped into memory. This results in much faster display than is possible with conventional single-port RAM. WRAM is similar to VRAM, but achieves even faster performance at less cost because it supports addressing of large blocks (windows) of video memory. See VRAM and SGRAM.

### **write**

To record or store information to a storage device.

### **write-back**

Also called copy back. A cache strategy where write operations to data stored in the internal microprocessor L1 cache aren't copied to system memory until absolutely necessary. In contrast, a write-through cache performs all write operations in parallel; data is written to system memory and the L1 cache simultaneously. Write-back caching yields somewhat better performance than write-through caching because it reduces the number of write operations to main memory. See cache and write-through.

### **write-through**

Also write-thru. Write-through characterizes a cache strategy where data is always written into system memory when data is written by the CPU. See cache and write back.



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# Regulatory Statements

The following regulatory statements include the Federal Communications Commission (FCC) Radio Frequency Interference Statement, compliance statements for Canada and Europe, battery disposal and replacement information, and the Declaration of Conformity.

## ***FCC Statement for United States Only***

 **WARNING** Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Note** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from the one to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## ***Canadian Department of Communications Compliance Statement***

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations (pursuant to ICES-003 Issue 2, Revision 1).

## ***Avis de conformité aux normes du ministère des communications du Canada***


Cet équipement numérique de la Classe B respecte toutes les exigences du Règlement sur le matériel brouillage du Canada (en conformité avec ICES-003 Emission 2, Révision 1).

## ***European Community Directive Conformance Statement***


This product is in conformity with the protection requirements of EC Council Directive 89/336/EEC on the approximation of laws of the Member States relating to electromagnetic compatibility. This product satisfied the Class B limits of EN55022.

## ***Battery Replacement***

A lithium battery maintains system configuration information. In the event that the battery fails to maintain system configuration information, NECC recommends that you replace the battery. For battery replacement information, see Section 3, "Disassembly and Reassembly."

 **WARNING** There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

---

 **AVERTISSEMENT** Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

### ***Battery Disposal***

The CMOS battery is made of lithium. Contact your local waste management officials for other information regarding the environmentally sound collection, recycling, and disposal of the batteries.

### ***Mini-PCI FCC Registration Numbers***

If your system has a built-in mini-PCI modem, the FCC registration number of your system is H8NTAI-34309-ME-E REN 0.4. If your system has a built-in mini-PCI modem/LAN, the FCC registration number of your system is 2U6MLA-34036-M5-E REN 0.5A.

**NEC**

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